



## INTRODUCTION

### OBJECTIVES

The objective of the Edwards Air Force Base (AFB) Design Standards Manual is twofold: First, to establish guidelines that ensure consistency in the construction and design of buildings, their interiors, and infrastructure systems throughout Edwards AFB; and secondly, to create a common level of understanding on how to design future projects at Edwards AFB.

Implementing these guidelines requires a team effort from the entire Base community and contractor team. There must be awareness that the standards exist and a commitment by everyone to comply with them.

### ORGANIZATION

The Design Standard is divided into sections and subsections and deals with everything from new construction and design, to additions and remodeling. Each section and subsection applies to both mission and family housing areas. *The guidelines are italicized where housing standards differ from mission standards.*

### RELATION TO OTHER PLANS AND STANDARDS

A listing of other community plans and standards is provided at the end of this document. Copies of these reference materials are available from the particular point of contact (POC) and should be used when applicable in conjunction with this standard.

### HOW TO USE THE GUIDELINES

Read the appropriate guidelines for the proposed or anticipated project, and define the project to fulfill the Base standard without becoming “gold plated.” Direct any questions to the POC listed on page 81. For specific subject references, refer to the index.



*Headquarters Building-renovation project.*



*Dormitory-renovation project.*



*New Hobby Shop under construction.*



*Flight Test Engineering Management Facility*

## **MAINTAINING RESEARCH, DEVELOPMENT, TEST AND EVALUATION (RDT&E) EXCELLENCE**

Sustaining our positions on the “leading edge of technology” requires dedication and perseverance in developing a quality Base necessary to carry out our missions. This means creating quality facilities to enable our personnel to accomplish their work, and maintaining quality work environments which foster a desire to excel.

## **QUESTIONS**

For general questions or information about this Guide, contact the Civil Engineer Group Engineering Division Office (CEC). Direct specific questions to the POC listed at the end of this guide.



## EDWARDS AIR FORCE BASE (AFB) COPREHENSIVE PLAN

### FUNCTION

A master plan entitled **Edwards AFB Comprehensive Plan** has been developed to update the Edwards AFB program for protecting and enhancing the physical appearance of facilities on Base. (See other Edwards AFB Plans and Guidelines for information on the complete plan.)

### INTENT

An orderly development of Edwards AFB that will lead to a quality Base is a goal that requires a roadmap for guidance. These guidelines provide the direction desired in developing a quality Base at Edwards AFB.

### GUIDELINES

**General.** When preparing new construction or renovation projects the designer shall use **Edwards AFB Comprehensive Plan** as guidance.

**Site Planning.** Development of the Base shall conform with the intent of the master plan to provide a quality base. Existing and future plans shall be reviewed and taken into consideration when developing areas.

**Main Base Areas.** The Main Base general existing land use areas and general land use proposal areas have been identified as noted on the maps shown on pages 4 and 5.

**Tenant Areas.** There are several tenant organizations located on Edwards AFB. The largest of which is the Phillips Laboratory (Rocket Propulsion Directorate). Tenant organizations are required to participate as part of "Team Edwards" with the goal of developing a quality base. The National Aeronautics and Space Administration (NASA) Dryden Flight Research Center is also located at Edwards. They are encouraged to follow these standards as well.



*Main Base*

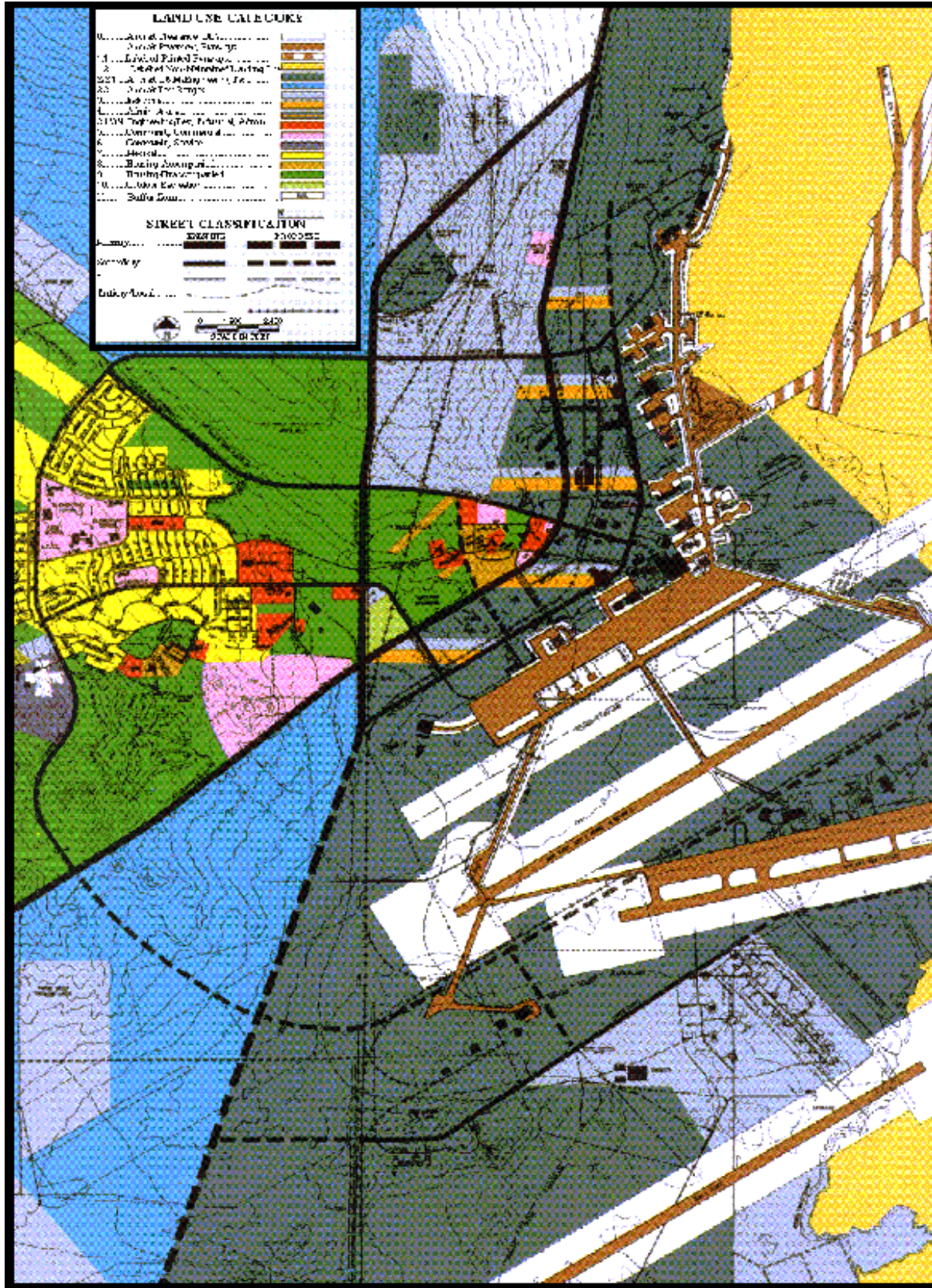


*Phillips Laboratory area -aerial view*



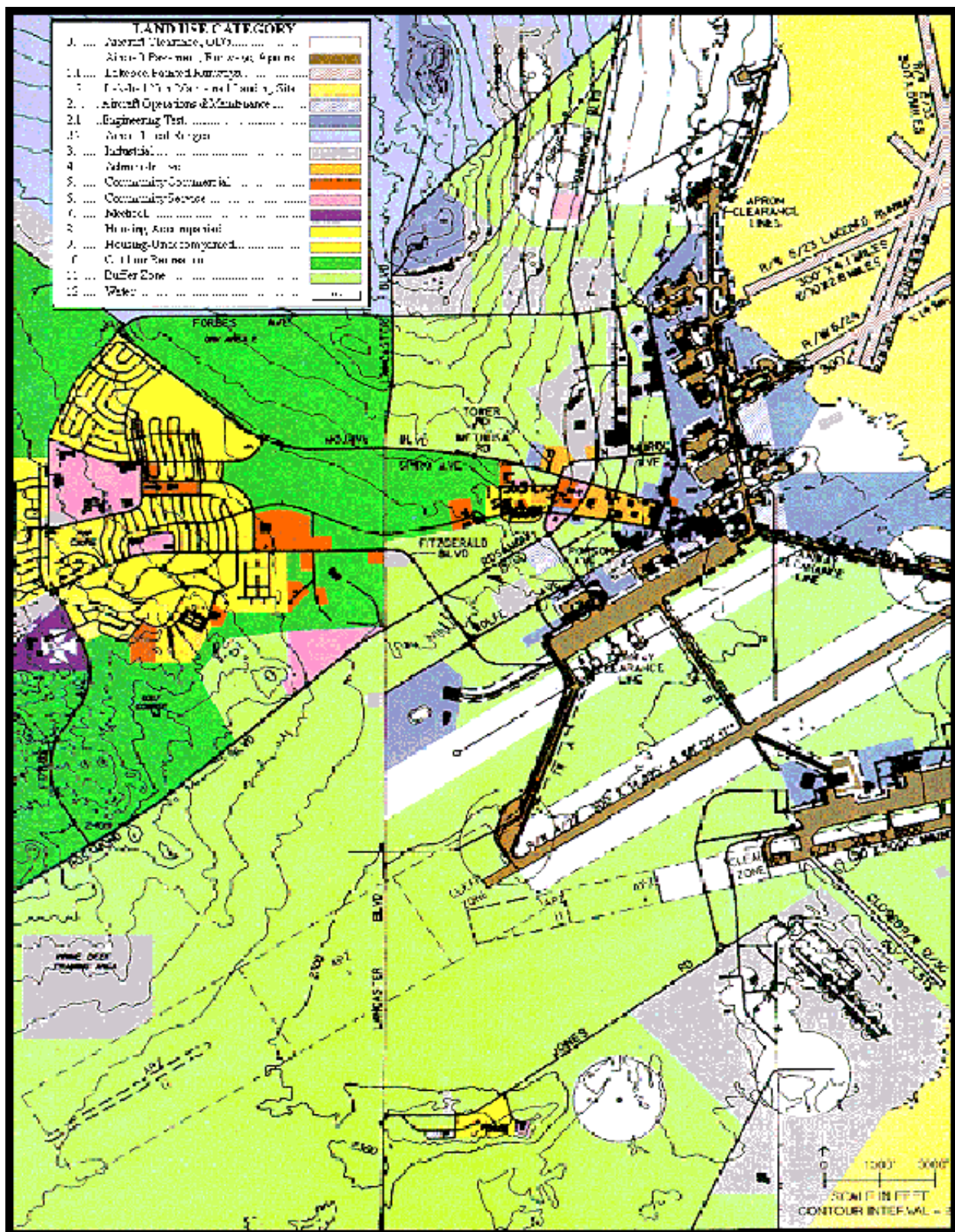
*NASA -aerial view*





*Location of General Land Use Proposal at Main Base and South Base*







*Contractor storage area*



*Screened fence around construction site*



*Creme colored construction trailer*

### *Generalized Existing Land Use at Edwards AFB Developed Areas, Main Base and South Base*

#### **Contractor Storage Areas and Laydown Areas.**

When projects are under design or in planning at Edwards AFB, specific areas will be designated where contractors locate a construction office trailer and stockpile tools and materials. These areas will be designated on project drawings or in project contract documents, and will be located as conveniently as possible to the work site where visual impact will be minimal. The Base Civil Engineer (BCE) will review all locations proposed for construction office trailers and will be the approval authority for this action. The BCE project representative will review the approved location as a preconstruction conference agenda item.

The following specific requirements will apply:

Porta-potties needed by the contractor will be permitted at the construction site at a location that minimizes the visual impact, preferably inside the fence.

The construction site shall be fenced and screened to restrict site access and reduce the visual impact of the construction work. Acceptable fencing shall consist of conventional chain link fence with green fabric to eliminate public view of the construction site and laydown area.

All required signs for construction shall be combined into a single on-site sign. This sign shall include information on the standard Corps of Engineers project information (for those projects where applicable) and the contractor's business name. Mandatory "Hard Hat Area" signs will be posted as safety regulations dictate.

Construction office trailers shall be in good repair, of minimum size and painted a color to match or complement the Base color scheme.





## ARCHITECTURAL STYLE

### FUNCTION

The architectural style for the Air Force Flight Test Center and Base tenants, such as the Air Force Phillips Laboratory and the NASA Dryden Flight Research Center should exhibit the unique substance of the Base which is a “One-of-a-kind, most high tech center in the world” for aircraft and rocket propulsion Research, Developmental Test and Evaluation (RDT&E).

### INTENT

The development of Base facilities should adhere to a general architectural style which results in a sense of direction being imparted on the developed areas. These guidelines provide the general direction for the development of Base areas.

### GUIDELINES

**General.** The general approach of the Base architectural style is to develop facilities which are sophisticated and modern with solar control features such as deep overhangs, recessed windows, and protected entrances and exits. The facilities should generally be low buildings, *Marble Creme* color, with *Redwood* colored low hip roofs. This approach, in general, is a modern Southwest style with features softer than the flat roof box look of the traditional Southwest style.

**Dormitory Area.** Development in this area should exhibit a residential character with a softer finish than the flightline area.

**Flightline Area.** Development in this area should exhibit a utilitarian character with direction to create a space where function is paramount while providing personnel a work area that is conducive to performance excellence.

**Service and Supply Area.** Development in this area should exhibit the modern Southwest style.



*Dormitory Area -architectural style*



*Flightline Area -architectural style*



*Photo Lab Service Area -architectural style*



*Typical Family Housing Area*



*Engineering and Administration Area, FTEMF Building 2750 -architectural style.*



*AFFTC Headquarters, Building 1 -architectural style.*

**Family Housing Area.** Development in this area should exhibit the quality and character of medium priced housing developments in the local community.

**Engineering and Administration Area.** Development in this area should exhibit the quality and characteristics found somewhere between the AFFTC Headquarters Building 1 architectural style, and the FTEMF Building 2750 architectural style.

**Renovations and Additions.** Projects in this category should improve the development of the facilities with complementary features which are similar to the existing facilities and with features of the Base architectural style.

**Temporary Structures** should be avoided where possible. If a temporary structure is required for construction site offices, etc., contractors are encouraged to obtain units that match or complement the Base color scheme.

**Energy Efficiency.** The Edwards AFB area is subjected to temperature extremes of very hot in the summer and very cold in the winter. Facilities should be developed to minimize the amount of energy used in Heating, Ventilation, and Air Conditioning (HVAC) systems to offset these extremes. Facilities should have a minimum number of windows on the south and west side due to high solar heat loads for this area. Use solar protecting overhangs and recessed double paned windows to provide shade for these areas. Adequate insulation systems should be installed to minimize heat loss and gain, through facility structures. Provide protected entrances and exits to minimize air infiltration.

**Entrances** should not face southwest due to the occasional high winds predominantly out of this direction which blow sand and dust. Wind screens maybe constructed at existing entrance doors. Design and materials must match or accent the existing construction. Prior approval of materials and design are required by the BCE.





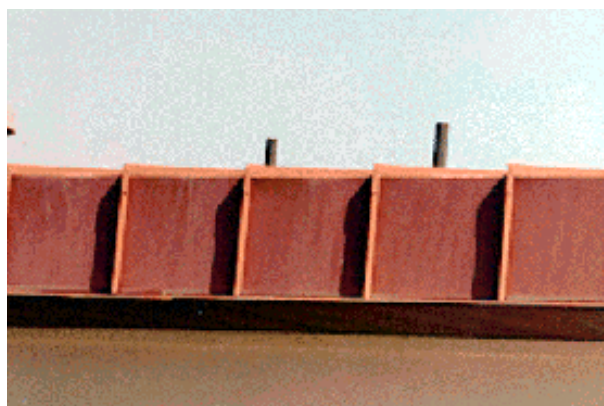
**Facades, Fascias and Soffits.** These features are used in varying degrees around the Base areas. Administration and dormitory facilities are normally constructed with deep 18- to 24-inch fascias where the roofing material is dropped vertically the distance of the fascias. This general rule is relaxed on the flightline with smaller fascias. The facades of new facilities should blend into the style of facades used on surrounding buildings.

**Metal Railings and Handrails** shall be painted to match the color of the facility trim.

**Solar Screening.** Window overhangs should be designed into the facility for providing shade to windows facing the west.

**Special Windows.** Skylights should be used where feasible to provide supplemental interior lighting. Any clerestory windows should face the north or be covered with an overhang.

**Windows** shall be positioned and sized to minimize the solar heat load on west and south facing windows. Windows shall be double paned.



*Smaller fascia used at the flightline area.*



*FTEMF Building -patio area metal railings.*



*Window overhang shades windows.*



*Exterior insulation finish system applied to new education buildings.*



*Slump Block used for special purposes.*



*Split-face concrete masonry unit block building.*

## EXTERIORS

### FUNCTION

Development of exteriors of facilities require guidelines to achieve the goal of installation excellence at Edwards AFB.

### INTENT

The following guidelines provide standards to be used in formulating the approach and development of the exteriors of facilities at Edwards AFB.

### GUIDLINES

**General.** The application of these standards are to be directed toward providing facilities with aesthetically pleasing and highly functional exteriors to serve as quality use areas for the personnel at Edwards AFB. There shall be no visibly exposed equipment hanging on walls such as expansion tanks, electrical conduit and wiring, copper pipes, mechanical ducts, etc.

**Stucco** final exterior finish texture shall be medium sand finish with accents in smooth trowel finish. Color conforming to Edwards AFB exterior color standard *Marble Creme* shall be integrated into the final coat. Do not design these systems to grade. The finish system shall have a "C" channel or similar stop at all edges and not be allowed to die into the next finish. Stucco application over an Exterior Insulation Finish System (EIFS) is the preferred method of obtaining the stucco look.

**Concrete Masonry Units.** Split-face common block with integral color, *Doe Skin*, as manufactured by Angelus Block Company, Orange, California (or equal) shall be the accepted finish exterior look of concrete masonry unit buildings. Ribbed split-face block or common block in a course or two may only be used for accent purposes. Standard block may only be used when it is not seen as an exterior finish.

**Slump Block** shall be used only where necessary and desirable to accomplish architectural compatibility with previous construction.





**Concrete** may be natural gray, depending on its relationship to gray walking surfaces, or it may have an integrated color to match split-face block. Painting exterior concrete is not allowed. Any concrete left as an unfinished element shall have an architectural finish.

**Wood** products are discouraged for use as an exterior finish on buildings. Metal products should be investigated for use as wood substitutes.

**Composite Building Panels** are acceptable for building wall construction. Panels shall be colored *Marble Creme* if used as a wall or *Redwood* if used in an accent color location.

**Metal Coatings and Sidings** shall be factory-finished with coatings colored to match Edwards AFB standard paint scheme. Exceptions to this standard would be an anodized finish on metal window and door trim and a primer paint applied as a factory finish to be painted at the job site to match door frames, etc. Slight variations to the *Marble Creme* color may be used subject to approval of the Base Civil Engineer.

**Weather Resistant Construction.** Winds at Edwards AFB can be strong. All buildings and additions shall be designed to withstand a 70 mile per hour wind load. Building structures must take into consideration the direction and velocity of the winds. Entries on windward sides of structures require a shelter. Use I-90 wind resistance standards. Buildings shall have a roof diaphragm-to-wall connection with adequate strength to resist the severe uplift forces caused by the high winds. These connections shall be designed and constructed in accordance with the most stringent requirement of ASCE Standard 7—1995 Edition “Minimum Design Loads for Buildings and Other Structures (Wind Load Provisions)” or UBC—1994 Edition (Chapter 16, Division II) “Wind Design.” The roof diaphragm itself shall be designed and constructed with adequate strength to resist these forces. Buildings shall be kept to a minimum height (see Seismic Structure Requirements, page 26). All buildings shall have cast-in-place reinforced concrete foundations with a depth calculated by taking into account the height, weight, and shape of the building. Cold joints are acceptable and shall be in accordance with the Uniform Building Code (UBC).



*Civil Engineer Building -metal siding*



*Jet Engine Maintenance Building -wind shelter*



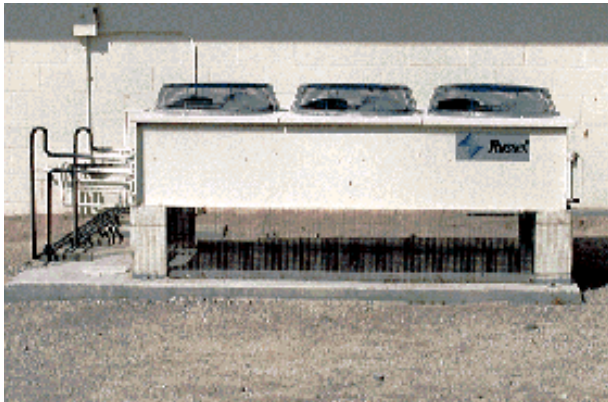
*Jet Engine Maintenance Building -composite building panels.*



*Ridley Exterior -Marble Creme walls.*



*Civil Engineer Building -trim and roof painted Redwood.*



*Pad-Mounted Equipment -painted Marble Creme*

**Insulation.** Buildings on Base shall be provided with a minimum composite wall system net insulation value of R-19, and a composite roof system net insulation value of R-30.

**Exterior Insulation Finish Systems** are encouraged for use where applicable on Base buildings. Special consideration for damage resistance to areas below 3 feet off the ground shall be applied to these finishes.

**Painted Exterior Surfaces for Main Base Areas.**

Integrated colors and factory finish colors are encouraged where applicable. Those areas requiring painting shall comply with the Base standardized paint color scheme which consists of the following colors at designated locations:

**Exterior Walls** to be painted shall be coated with *Marble Creme* as the primary color. *Marble Creme* paint shall be the color of Fuller-O'Brien formula No. 262-10, AA36 BB6 EE4 DD4 or Glidden formula 626L302 T-*Marble Creme* Satin Nebular for metal surface factory finishes. Paint finish shall be flat.

**Trim and Roofs** to be painted shall be coated with *Redwood* as the secondary color. *Redwood* paint shall be the color of Fuller-O'Brien formula No. 609-73, EE2Y FF7 LLY24 or Glidden formula No. 618R700 T-Low Gloss *Redwood* Nebular for metal surface factory finishes. Paint finish shall be semi-gloss.

**Equipment.** All exterior mechanical and electrical equipment shall be pad-mounted unless approved by the Base Civil Engineer. Pad-mounted mechanical or electrical equipment shall be painted to match the color of the adjacent building wall. Exposed vents, fans, exhausts, etc., located on roofs or facias shall be painted to match the color of the adjacent surface.

**Metal Doors Wider Than 3 Feet** shall be *Marble Creme* color except in split-face concrete masonry unit buildings. Doors in these buildings will be the color of the masonry units.





**Gates for Special Enclosures.** Gates for special enclosures constructed of split-face standard concrete masonry units shall be constructed of wrought iron bars the full height of the enclosure wall with 6-inch spacing between the bars. The gate shall be painted to match the integrated color of the split-face blocks.

**Bollards** shall be metal painted dark brown *Big Stone* when 20 feet or more from any facility. Bollards closer than 20 feet shall match the color of the item they protect. They may also be smooth cast stone with integral color. Two each, 4-inch-wide bands of *Big Stone*, or matching color reflective tape shall be installed near the top and mid-height of the bollard.

**Other Exterior Site Features.** Surfaces, other than factory-finished anodized Bronze finishes, shall be painted to match adjacent wall surface colors of *Marble Creme* or *Doe Skin*. Items in this category consist of utility meters, exposed vents, fans, exhausts, etc., exterior backflow preventers, exposed exterior ducting, exterior transformers, exterior air handling units and condensers (if visible and not hidden behind screen walls), exterior metal grills and grates (if mounted in the wall section of the building); building (fire) standpipe connection (for fire truck) and back cover plates, along with other miscellaneous equipment installed near building.

### Emergency Equipment

**Fire Bells** shall be painted the same color of the surface they are mounted on (exterior and interior).

**Eye Washes** shall be painted to match the adjacent building wall.

**Fire Hydrants** shall be painted dark brown *Big Stone* color from the Fuller O'Brien Paints color palette. Two each, 2-inch-wide bands *Big Stone Brown* colored reflective paint shall be installed near the top and mid-height of the fire hydrant for locating at night. Blue "frogs" shall be installed in the driving lane at hydrants.



*Switch Station -coordinated colors between gates and walls.*



*Fire Bell -painted to match adjacent wall color.*



*Fire Hydrant -painted brown.*



*Equipment painted to match adjacent building.*



*Post Indicator Valve -painted a dark brown color.*



*Family housing paint scheme.*

**Post Indicator Valves** shall be painted a dark brown, *Big Stone* color if they are located more than 20 feet from the building. They shall be painted to match the adjacent wall surface if they are closer than 20 feet to the building.

***Painted Exterior Surfaces for Housing Areas.*** *Integrated colors and factory-finished colors are encouraged where applicable. Those areas requiring painting shall comply with the Base standardized paint color scheme consisting of the following colors at designated locations:*

***Exterior Walls*** to be painted shall be coated with paint matching the color of Fuller O'Brien Paints Golden White paint No. 8-70-8 or Pale Bark paint No. G-24. Paint finish shall be semi-gloss.

***Trim*** to be painted shall be coated with paint matching the color of either Fuller O'Brien Paints Golden White paint No. 8-70-8, Pale Bark paint No. G-24, Hide paint No. H-81-H, or Redwood Fuller-O'Brien formula No. 609-73, EE2Y FF7 LLY24. Paint finish shall be gloss or semi-gloss.

***Combinations*** of paint colors shall consist of paint matching the color of the following Fuller O'Brien Paints colors at the designated locations:

1. Wall - Golden White, Trim - Pale Bark
2. Wall - Golden White, Trim - Hide
3. Wall - Golden White, Trim - Redwood
4. Wall - Pale Bark, Trim - Golden White
5. Wall - Pale Bark, Trim - Hide
6. Wall - Pale Bark, Trim - Redwood





**Roofs** shall meet the requirements noted in the following paragraphs.

**General.** Roofing materials at Edwards AFB are subject to extreme climatic conditions, especially during the summer. Roofing materials made of petroleum based products have a shorter than normal life span; therefore, their use is discouraged. Metal roofing, especially standing seam metal roofs, is used extensively throughout the Base and is encouraged. Safety “tie downs” shall be installed on new or reroofing projects with a pitch of 4 in 12 or more per OSHA 3146 and CFR 1926.450-500 subparagraphs L and M.

**Flat Roofs** shall be used only when necessary to accomplish a maximum span and must be approved by the Chief of the Engineering Division or a higher level. These roofs shall have a slight slope built in to accomplish drainage to roof drains, scuppers or downspouts. Built-up roofing shall be used only when it is not feasible to use a metal roofing system.

**Asphalt Shingles/Lightweight Concrete Tiles (Non-Asbestos)** shall be used primarily in the residential areas. Gables, hips, and shed roofs shall be the design types allowed. Pitches shall be 3:12 to 4:12 for any roof receiving shingles/tiles.

**Roof Color** shall be *Redwood* unless otherwise directed by the Base Civil Engineering (BCE).

#### **Built-up Roofs (BUR)**

BURs are generally not acceptable and shall only be used if approved by the Chief of the Engineering Division within Civil Engineers or higher. In most cases metal system roofs are preferred. If BURs are approved for use:

- BURs shall be concealed by parapet walls.
- Roof shall be a minimum 3-ply built-up roof with a mineral cap sheet.
- Gravel on built-up roofs is not allowed.



*Family Housing -paint scheme*



*Family Housing -paint scheme*



*Family Housing -paint scheme*



*Redwood colored standing seam metal roof.*



*Built-up roof concealed by a parapet wall.*



*Built-up roof with equipment curb.*

**Crickets.** Provide on up-slope side of equipment curbs that are wider than 18 inches.

**Service Walkway.** Provide rubber chip walk treads or other approved systems on roofs from access ladders to sides of mechanical equipment where seasonal maintenance is required.

**Equipment Curbs.** Curbs shall be provided at all rectangular roof penetrations and at round piping which exceeds 8 inches in diameter. Curbs shall be a minimum height of 8 inches above roof.

**Roofing Schedule.** Applicable for the indicated slopes over all decks.

No dead level roofs shall be allowed.

Slopes  $\frac{1}{2}$  inch to 3 inches per foot shall be mineral surfaced with 3 plies type VI asphalt coated fibrous glass felts and an additional glass fiber cap sheet and asphalt, type VI.

**BUR Installation** shall be scheduled to complete each area of work on the same day. Install temporary water cutoffs and tie-ins at the end of each workday. Remove temporary cutoffs and tie-ins on resuming work so that all vertical faces of insulation are exposed.

**Flashing Installation.** Prime all surfaces to be flashed with asphalt primer and allow to dry.

**Roof Drains.** Internal roof drains shall be used only on very large roofs. Exterior roof drains and downspouts shall be used to divert water runoff as required for the specific project.



**Gutters** shall be fabricated in one continuous piece without joints up to 50 feet maximum lengths, flat face shape, 6 inches in size.

**Downspouts** shall be fabricated rectangle or round, corrugated with flatlock seams, and 4 inches in size.

**Mastic** shall not contain asbestos compounds.

### Standing-Seam Metal Roofs

**General.** Metal roof systems shall be sloped a minimum pitch of ½ inch per 12 inches, to a maximum pitch of 6 inches per 12 inches over existing roofs. Provide positive free air ventilation between the existing roof and the new roof.

All existing stacks, conduit, etc., shall be raised onto curbs and supports that are structurally integrated into the new roof system. Flashing and accessories shall be provided as required for a complete roof system. Exposed areas of wood or sheet metal fascia, coping, etc., shall be painted.

The manufacturer shall furnish the subframing system, panel system, standard accessories, and sealants which shall all be covered under its 20-year material and weathertightness warranty.

**Design** shall comply with the following standards:

- Manual of Steel Construction (1990 Edition)
- American Institute of Steel Construction
- Cold Formed Steel Design Manual (1990 Edition)
- American Iron and Steel Institute
- Metal Building Systems Manual (1990 Edition)
- Metal Building Manufacturer's Association
- The design loads shall include live loads and snow loads, in addition to dead loads.



*Built-up roof with downspouts.*



*Standing Seam Metal Roof -installed over existing roof.*



*Vents -raised intergrated into roof.*



*Housing Office Building -metal roof*



*Typical standing seam metal roof.*



*Metal roof over swimming pool building.*

**Vertical Live and Snow Loads.** Roof covering shall be designed for either 50 pounds per square foot (psf) uniformly distributed or a 200-pound concentrated (point) load (over a 1-foot by 1-foot area) located at the center of the maximum roofing (panel) span. The most severe condition shall govern.

Reroof framing members shall be designed for 25 psf uniformly distributed over the roof area which they support.

All snow loads to be in addition to the applicable dead loads and shall be applied to the horizontal projection on the roof.

**Wind Loads.** The wind load on the roof shall be 24 psf proportioned and applied as an uplift force according to and as recommended by the Metal Building Systems Manual.

The roof covering and its attachment to subframing members shall carry an Underwriters Laboratories Construction (Uplift) listing of no less than Class 90.

Subframing shall be designed in such a way that roof loads (live and dead) are transferred through the subframing and into the structural members of the existing roof. No loads are to be transmitted to the existing roof in locations other than at structural points.

**Vented Cavity.** The cavity created between the existing and the new roof shall be properly vented to provide a minimum of three air changes per hour with a 5 mile per hour wind.





**Subframing .** The subframing system shall be designed to transfer roof dead and live loads and wind uplift directly into the existing structural members. The system shall be designed to its capacity. The roof covering, fasteners, and supports shall weigh a maximum of approximately 2.5 psf.

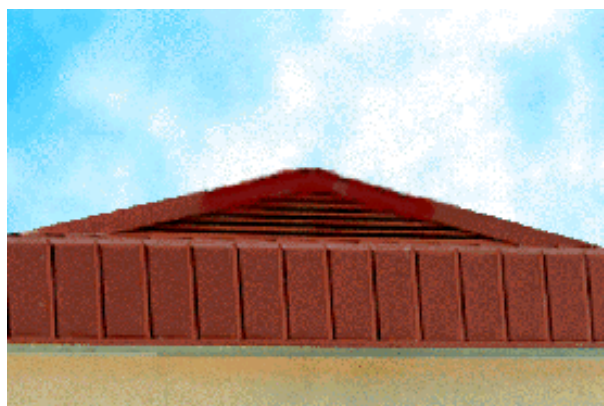
**Subframing System.** Materials - G90 Galvanized Steel

### Roof System

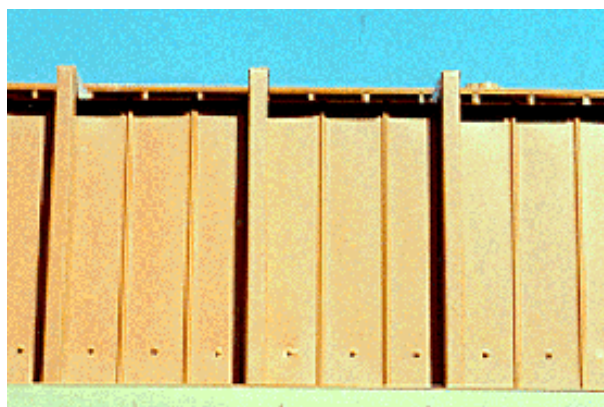
The exposed metal roof covering shall be 16 inches wide, 24 gauge (minimum) of commercially pure aluminum coated steel panels, and of such configuration to provide the specified load carrying capabilities and deflection requirements of this specification. Roof panels, 24 inches wide of 22 gauge or 12 inches wide of 24 GA maximum are also approved.

Roof panels shall be of standing seam interlocking design and secured to the supports with a concealed structural fastening system. The concealed system shall provide minimal through penetration of the exposed roofing surface and allow the roof covering to move minimum of 1.0 inch in either direction, independently of any differential thermal movement by the framing system. Except at the concealed fastener, there shall be no thermal contact of the roof panels with the supporting member. The standing seams shall have the following features.

Integral male and female interlocking ribs with a factory applied, nonhardening sealant, and the seams shall be continuously locked or crimped together by mechanical means during erection.



*Vent cavity between existing building and metal roof.*



*Sixteen-inch-wide metal roof pan*



*Education Center Building with metal roof.*



*Metal roof standing seam interlocking design..*



*Metal roof panel fastened to secondary support members..*

Roof panels with lap type side (longitudinal) joints or those requiring battens or other nonintegral sealing means or exposed structural fasteners are not acceptable.

Interlocking ribs shall form a closed, flat panel configuration along the underside of the panels, providing a weather tight condition not dependent upon closure gaskets at the ribs. Ribs with a trapezoidal configuration requiring closure gaskets are not acceptable.

Roof panels shall be fastened to the secondary support members with a concealed clip or backing device of steel having a protective metallic coating. Through penetration of the roofing surface by exposed fasteners shall occur only for nonstructural flashing connections at terminal locations of the roof panels. Such fasteners shall be stainless steel screws, with weather seal washers.

On-site roof formed panels will not be accepted.

Create a separation to eliminate metal to metal contact between the roof panels and purlins by the use of vent spacers.

All roof system components shall be made of the same type material and be covered under the same warranty period.

**Trim System** Fascia panels shall be back coated for protection of interior surface. Color shall be *Redwood* as formulated by AEP SPAN. Eaves trim shall be factory coated with color finish and slotted to allow intake of air to provide required cavity air changes. Color shall be *Redwood*.





**Drainage System.** Internal roof drains shall be used only on very large roofs. Exterior roof drains and downspouts shall be used to divert water run-off as required for the specific project. Downspout shall terminate at ground level by means of an elbow, polyvinyl chloride (PVC) boot or cast iron boot or splash block.

### **Curbs and Vents**

Low profile vents shall be incorporated into the roof. Low profile intake ventilators shall be provided near the new eave line. The ventilators shall be constructed of aluminum with finish to match roof panels.

All roof top equipment and round roof openings larger than 13 inches in diameter shall be integrated into the new roof system using 16 gauge aluminum curbs. All of the joints in the curb will be welded.

Round roof openings 13 inches in diameter or smaller may be flashed to the new roof using either 16 gauge welded aluminum curbs or a flexible EPDM rubber flashing with an aluminum sealing ring base (Buildex Deck Tite or equal).

All roof openings will be structurally supported around all edges by the sub-framing system.

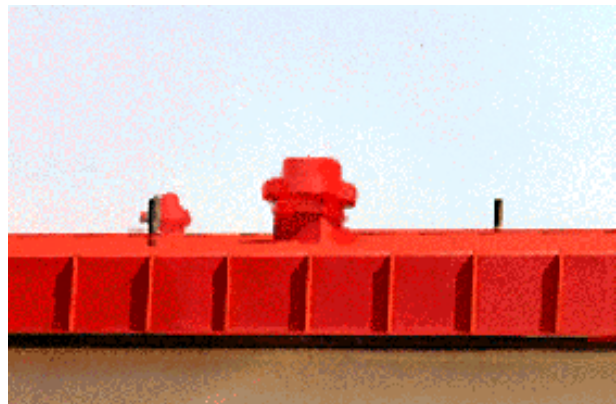
All curbs and vents shall be adequately caulked with a nonhardening sealant and fastened to the adjoining roof panels with fasteners using weather seal washers. All connections to be weather tight and covered by any applicable weather tightness warranty. All repairs shall use similar material as original roof material.



*Typical fascia panels.*



*Metal roof gutters and downspouts.*



*Metal roof low profile vents.*



*Roof top equipment require aluminum curbs.*



*Roof is painted Marble Creme color on larger buildings.*



*Metal deck required under standing seam metal roof.*

**Metal Roof Systems** including standing-seam, architectural batten-seam, and mechanically lapped-seam roof membranes are acceptable.

**Roof Color** shall be *Redwood* for structures up to 2 stories and *Marble Creme* for higher roofs like hangars.

**Metal Roof Installation.** Roof hold-down clips, penetrations, and terminating flashings must allow the weathering metal membrane and its components to expand and contract uniformly with temperature variations.

Penetrations should be kept to a minimum.

A minimum of 2 inches of vapor retarding faced insulation shall be provided for noise and condensation control. Insulation shall be installed under the metal panel regardless of thermal insulation values required.

A metal deck shall be provided as required under the standing seam roof for stability and safety on new construction when rigid board insulation is specified.

No laps shall buck water anywhere on the roof assembly. There shall be no exposed fasteners on the ridge assembly, and a heavy duty type fastener or rivet that will not back out should be used.

For installations near the flightline or other areas where vibrations can be experienced, panels shall be attached with rivets or fasteners that will not back out.

Longer runs of panel (more than 50 to 60 feet) shall have functioning expansion and contraction hold-down clips, as well as terminating flashings that will accommodate the full movement expected.

Designer shall not use interior gutter system.





Ridge metal cap shall have fastener or rivet that will not back out.

Fasteners shall be designed to resist a net uplift of 24 pounds per square foot.

Standing seams shall continue on down and wrap onto and down the fascia whenever standing seams are used.

**Site condition.** All trees shall be cut back a minimum of 25 feet from edge of roofs.

*Shingles shall be used only on residential units in the Housing and Community Center area. Colors shall be shades of Brown and Redwood and may vary unit-to-unit or by neighborhood.*

**Placement of Equipment on Roofs.** Equipment placed on roofs is discouraged and should be mounted in equipment rooms preferably or on the ground where possible. All equipment required to be placed on metal or built-up roofs shall require approval of the Base Civil Engineer, and shall be mounted on equipment supports a minimum height of 8 inches above the roof. Parapet walls shall be used with flat or low sloped roofs to screen roof mounted equipment whenever possible.

**Roof Ladders** shall be installed with safety cages and locking secure devices per CFR 1926.1053-19 I, II and II. They shall be painted to blend in with the wall to which they are attached.

**Mechanical System Intakes** shall be installed away from vehicle loading areas.

**Electrical Systems** shall meet the following requirements.

**Substation Transformers** shall be copper wound, automatic load tap changing type with 16 taps above neutral and 16 taps below neutral, mineral or synthetic oil immersed, rated at 12,470 volts or 34,500 volts as required, splices and terminations to be separable connections, dead front service transformers. A label indicating "No PCB containing fluids" shall be attached to the transformers. Transformers shall be painted *Marble Creme*.



*Standing seam metal roof continues on down fascia.*



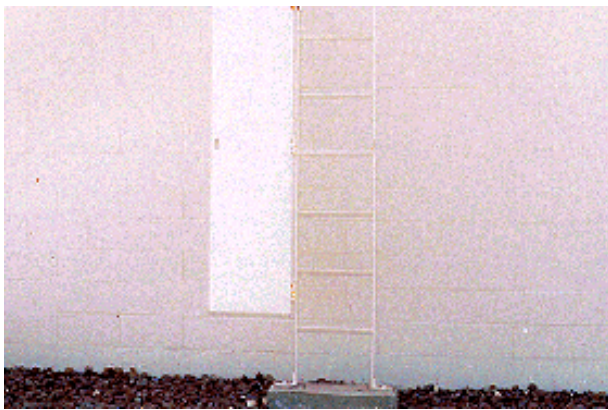
*Trees cut back 25 feet from roof edge.*



*Shingle roof used on family housing unit.*



*Roof-Mounted Equipment -is discouraged*



*Roof ladder with locking secure device.*



*Substation transformer.*

**Medium Voltage Switches** shall be pad-mounted outdoor type, liquid insulated vacuum interrupter type and dead front construction. Switches shall be painted *Marble Creme*.

**Medium Voltage Cable** shall be single copper conductor, shielded, and 133 percent EPR insulation rated at 15 kV or 35 kV as required. Splices and terminations to be separable connectors. Underground cable shall have copper conductors.

**Building Service Transformers** shall be copper wound, pad-mounted outdoor type, mineral or synthetic oil filled, rated at 12.47 kV delta primary 480Y/277 volt, 208Y/120 volt or 120/240 volt single phase.

**Metering** shall be provided for all facilities. They shall have remote reading capability and be compatible with the Base radio frequency system or fiber optics system for connecting to the Base SCADA/EMCS systems.

**Transmission and Distribution Lines** shall be underground where feasible or overhead armless construction type.

**Lightning Arrestors** shall be installed for voltage surge protection and be rated at the maximum continuous operating voltage for the system where they are installed.

#### **Doors, Hardware and Locksets**

**Doors** shall be of high quality construction and durable and easily maintained. Doors in flightline area buildings may be of steel construction and painted *Redwood* to match painted steel framing. Galvanized metal doors must be painted. Doors shall consist of the following types:

**Aluminum Doors** shall be 1¾-inch-thick with 3-inch-wide top rail and vertical styles, medium Bronze anodized, factory applied weather stripped, with square glazing stops, a 10-inch-high bottom rail and threshold.





**Steel Doors** shall be flush design, 1¾-inch-thick with steel grid core or steel stiffened core.

**Wood Doors** shall be 1¾-inch, solid core birch hardwood veneer flush face doors. Locksets shall be appropriate to function. All doors shall have silencers (except where weather-stripping occurs). A 16-inch-high minimum mop/kick plate shall be provided at the kick side of all wood doors.

**Door Hardware and Locksets** shall be factory finished with medium color anodized Bronze finish and match the building door and window framing system color. Standard size door knob use is encouraged. Locksets shall be compatible with the Base Schlage master keyway system. Main Base areas use a six pin keyway system. Material submittals are required for these items. *Housing Areas use a 5-pin keyway system.* Door hardware shall consist of the following types:

- Hinges, N.R.P. medium anodized Bronze finish.
- Lockset or knob anodized Bronze finish.
- Panic Hardware, full width, flush mounted, anodized bronze finish.
- Closure, medium anodized Bronze finish.
- Wall bumper, medium anodized Bronze finish.
- Kick Plate (stop side only), medium anodized Bronze finish.
- Threshold, brushed aluminum finish.
- Weatherstrip and Sweep, medium anodized finish.

**Door and Window Framing Systems** shall be factory finished with medium color anodized Bronze finish and will match building door hardware and lockset color. Material submittals are required for these items. All frames shall be mitered and welded. All door frames shall be 16-gauge pressed metal.



*Electric meter required at all facilities.*



*Ridley Building -entrance sliding doors.*



*FTEMF Building Entrance Doors -anodized Bronze finish.*



*Photo Lab -handicap access ramp.*



*Window and Hardware -anodized Bronze finish.*



*FTEMF Building -reflective glass.*

**Handicap Access** is required into habitable building spaces per the Americans With Disabilities Act (ADA). Handicap access into dormitories is limited to the first level rooms and common rooms.

**Windows and Hardware** shall have a heavy commercial rating as a minimum. Windows with a 1-inch total composite thickness with  $\frac{1}{2}$  inch air gaps are suggested for economic evaluation for the Edwards AFB area. Framing shall be medium anodized Bronze finish. Framing for buildings in the Flightline area may be steel painted Redwood color to match the painted steel doors and frames. Fixed windows shall be used in buildings with air conditioning systems. Material submittals are required for this item. *Housing windows shall be the opening type where applicable, to meet life safety code requirements.*

**Glazing:** Windows shall be dual glazed with a solar Bronze reflective tint having a transmittance value of approximately 52 percent.

**Misters** with fine water spray for outside cooling shall be installed at outside locations where personnel such as guards, etc., are exposed to ambient air temperatures.

**Seismic Structure Requirements.** Edwards AFB is located in seismic zone 4 which requires buildings to be designed to withstand substantial forces. The buildings must have sturdy foundations of reinforced concrete, heavy duty roof diaphragm and diaphragm-to-wall connection, and a solid connection between the foundation and the shear walls.

**Building Height.** Buildings shall be kept to a maximum height of 3 stories for office buildings and 75 feet for hangars. This will greatly reduce the possibility of a harmonic resonance type of catastrophic failure from occurring.

**Shear Wall Design and Construction.** The base shear for all new buildings and existing buildings being upgraded shall be calculated using the formulas provided by the most stringent governing code (Air Force Manual 32-1095 and UBC 2402). Shear walls shall be constructed of reinforced concrete where practicable. If timber construction is used, plywood sheathing shall be installed the





full height of the wall (sheathing shall be a minimum ½-inch thick). Reinforced masonry construction shall meet the requirements of UBC 2402. No nonreinforced masonry buildings will be allowed. For multi-story steel-framed buildings, Special Moment Resisting Frames shall be used.

**Soil Standards.** Imported fill material shall be free of large rocks, chunks of concrete, organic material, and contaminants such as oil, grease, solvents, or other hazardous substances. The fill material shall be of a soil class in the range of sandy to silty, which will be compatible when using the proper water content and shall provide an adequate soil bearing pressure. No clay fill materials allowed. Soil borings are recommended prior to design of new facilities. Soils at Edwards AFB are subject to erosion due to high winds. The result is the build up of dust on horizontal surfaces and portions of standard building details. This condition should be addressed during design.

**Demolition.** Surveys checking for asbestos, lead/chromium-based paint, shall be completed prior to start of any demolition. Demolition sites shall be restored to original conditions as close as possible. Cavities, depressions, etc., shall be filled in and seeded with desert wildflower seeds.

### Landfill Use Module Procedure

All construction debris from Base construction contracts shall be disposed in certified off-Base landfills. Contract specifications document this direction.

Under rare circumstances, CEC division may approach Base landfill operators (CEZH), in writing, for permission to dispose of construction debris in the Base landfill. Disposal material shall meet landfill certification requirements (e.g., no asbestos containing materials, etc.). Upon receipt of written approval and agreement from CEZH, CEC personnel will notify, in writing, the contracting officer. The Government will negotiate a fair “credit” to compensate for reduced dumping fees and travel distances.

All construction contracts require that (stated in the specifications) (1) prior to notice-to-proceed, a list of certified landfills used for the construction project, and (2) at the conclusion of the project, contractor manifested haul loads and matching



*Maximum height is three stories for office buildings.*



*Exterior Demolition -Survey for asbestos and lead or chromium-based paint prior to demolition.*



*Survey for asbestos, leadchromium-based paint prior to demolition.*



landfill certified “dump tickets” and a summary spreadsheet cataloging all disposal material. When submitting the information to the contracting officer, it is imperative the contractor match the haul manifest to the landfill receipt to confirm nothing is being dumped in noncertified locations. Likewise, it is imperative for the inspector and contracting officer to confirm this same one-on-one correlation. At the conclusion of the project, CEC personnel will send a certified and signed copy of the summary spreadsheet to the contracting officer and solid waste manager in Environmental Management.

### **Exterior Equipment Screening**

Ground mounted equipment shall be screened from view by use of concrete masonry unit walls constructed of standard split-face blocks with integral color No. 200, medium weight by Angelus block company, Orange, California (or equal) and grout the same color as the block.

### **Facility Numbers**

Each building on base shall have a facility number assigned by 95CEG/CER. The number shall be placed on two exterior, adjacent walls at their shared corner. The corner most prominent, first seen by visitors to the building as they enter the parking lot, shall be used as the location of the facility number.

The number, can be painted directly on the building wall or placed on a sign and attached to the wall. Typically the background shall be 2'-0" wide and 1'-0" high. The numbers shall be Helvetica Medium font, six inches high and centered within the background. The number shall be located on the wall 5'-4" above the first floor interior walking surface.

“Landmark” buildings may have larger numbering to allow identification from a distance. The size and location of the numbering will be determined by the BCE on a case by case basis.

The colors shall be Marble Creme and Redwood. The color of the wall where the number will appear shall dictate the background and number colors. Light colored walls shall have a sign with a Redwood background and Marble Creme numbers. A dark colored wall would have the opposite colors.





*Exterior Demolition -restoring site to original condition.*

## INTERIORS

### FUNCTION

Development of interior facilities guidelines will assist Edwards AFB in achieving the goal of installation excellence.

### INTENT

The following guidelines provide standards to be used in formulating the approach and development of the interiors of facilities at Edwards AFB.

### GUIDELINES

**General.** The applications of these standards are to be directed toward providing facilities with aesthetically pleasing and highly functional interiors.

**Spatial Guidelines** provide a facility which gives the occupants a feeling of spacious office areas. Use furniture systems in open areas with minimum fixed walls and columns and provide adequately sized mechanical, electrical, and communications rooms.

**Circulation.** Maintain the open office feeling by channeling traffic into passageways along the main axis of the buildings with clearly defined intersecting horizontal and vertical corridors.

**Approach.** Develop entrance areas providing a clear sense of arrival for the main functions of the facility. Use secondary spaces to identify avenues for traffic.

**Finishes.** The primary characteristics required for finishes are durability and compatibility with other facility components. All finishes shall comply with the UBC fire retarding requirements. All interior colors for paints shall be off-white. Gypsum wall board (GWB) shall be used as the primary material for wall and ceiling finishes. Water-resistant GWB shall be used in bathrooms, laundry areas, and other areas subject to high humidity or contact with water. Fire-rated GWB shall be used to achieve fire-rated assemblies between adjacent units.



*Open areas providing a spacious office feeling*



*An entrance area providing a clear sense of arrival.*



*Gypsum board walls with a light texture paint.*





*Ceramic tile used in restrooms.*



*Suspended acoustical tile ceiling, 2-foot by 2-foot grid system.*



*Carpeted office area.*

**Walls** shall be finished with one of the following preferred finishing systems.

Gypsum board shall be painted with a minimum of two coats of paint. A light texture paint is preferred. Texturing material shall be white, vinyl base, a formulation suitable for trowelling or spraying consistency. Wall and ceiling texture shall be "orange peel."

Wall Coverings shall have characteristics of good durability and easy maintenance. They should be passive colors with subdued patterns and used for accent walls only.

Wall Tile shall be 4 1/4- by 4 1/4-inch ceramic tile for use in restrooms, showers, and kitchen areas only.

Paneling shall be used only with the approval of the Base Civil Engineer for specific projects.

Concrete or Concrete Block shall be furred and finished with Gypsum board finish, primed and painted.

**Wall Base** type to be used shall be considered for compatibility with the other facility features and selection based on functional, economic and aesthetic qualities required.

**Wall and Corner Guards.** Plastic or other synthetic trim material shall be compatible with other components in function and fire rating.

**Ceilings** constructed with Gypsum board shall have a minimum of two coats of paint. *In the housing areas, a light skim coat texture is preferred.* Suspended acoustical ceiling tile system shall be 2- by 2-foot grid system capable of carrying recessed light fixtures. Acoustical tile shall be 24 inches by 24 inches by 5/8 inch, regular lay-in type. Install ceilings in a regular pattern without border, joint lines parallel to walls. Install symmetrically about centerline of each room or space.



**Flooring** shall have subtle pattern and colors, be durable and easy to maintain. Floor coverings of hardwood, sheet vinyl goods (Federal Specification L-F-475a(3), Grade B or C), carpet or ceramic tile shall be provided and shall conform to one of the following preferred flooring systems:

Concrete floors without any covering shall be limited to the industrial area facilities.

Painted floors require approval of the Base Civil Engineer. Where approved hangar and shop floor coatings shall be a two-part water-based epoxy type paint, Zoeller Gaurd or equal.

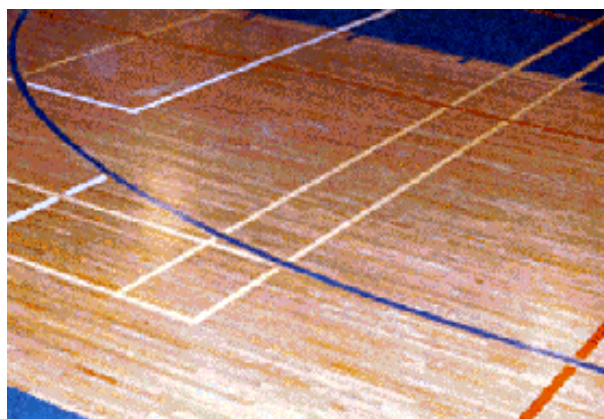
Wood flooring exposed shall be limited to game rooms only. Wood subflooring is acceptable.

Vinyl tile flooring shall be a minimum of 1/8 inch thick and may be used where acceptable by code. A high quality vinyl composition tile with a through pattern shall be provided. Vinyl tile is preferred in high traffic areas. Sheet vinyl flooring shall be 12-foot-wide roll stock.

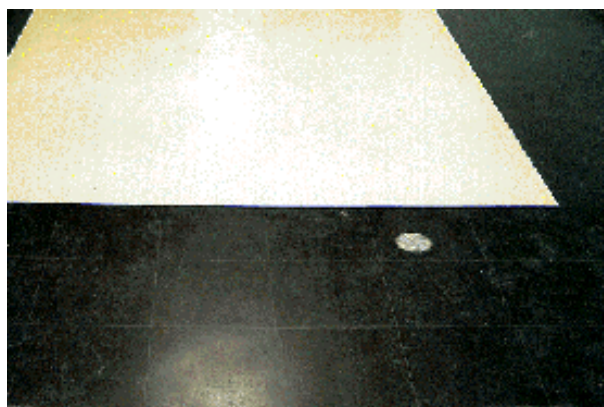
Raised floor systems shall be a bolted stringer type and shall meet California seismic codes, and the support and under floor space requirements of the user. The raised floor system shall be grounded for safety hazard and static suppression as required by the user to protect all computer systems.

Carpet shall be compatible with the function of the area where it is being installed. Patterns which blend in marks and traffic pattern wear are preferred. Carpet shall only be installed in authorized areas. Carpet selection shall be based upon a 7-year expected use period. Carpet shall have the following characteristics:

- Woven, tufted or fusion bonded.
- Plush cut, frieze (twist), cut and loop, or loop.
- Medium Face Weight: 32-ounce, plush cut; 28-ounce, cut and loop or frieze (twist); or 24-ounce, loop pile.



*Wood flooring used in game rooms.*



*Vinyl flooring.*



*Carpet with pattern.*





*Interior wood door.*



*Door hardware and lockset, anodized Bronze.*



*Interior door hardware with standard size door knob.*

- A synthetic (polypropylene) backing shall be used. The use of an organic (jute) backing is not permitted.
- Carpet gauge shall be 1/8 or 1/10.
- The carpet shall pass the Department of Commerce (DOC) FF 1-70 Pill Test (7 passes from 8 specimens) and the requirements of NFPA 101, The Life Safety Code.
- The yarn shall be branded by the fiber producer, Nylon-6, 6, or Nylon-6, with a soil and stain resistant finish.
- Carpet shall be selected from a neutral palette of carpet and shall have a pattern.

**Walkoff flooring.** Provide recessed walkoff flooring in traffic lanes for all main entrance foyers.

**Ceramic Tile** shall be thin set over concrete only. Ceramic floor tile shall be unglazed with grout color to coordinate with the tile color selected. Use unglazed porcelain tile in bathrooms and other wet environments.

**Trim** shall be compatible with other components of the facility and have the following features listed below.

Wood trim to be painted shall be paint grade.

Trim to be stained or clear finished shall be stain grade.

Metal door frame trim shall be painted.

Plastic or other synthetic trim material shall be compatible with other components in function and fire rating.

Vinyl cove base shall be 4 inches minimum.

#### **Doors, Hardware and Locksets**

**Doors.** Interior doors shall be compatible with the function of the area where they are to be installed. Hollow core wood doors are not allowed. Generally, doors with steel frames that



conform to the following use for specific locations are preferred.

Use solid core wood doors for general interior office areas.

In industrial areas, use painted metal doors.

Doors shall consist of the following types:  
(See Exterior section, subparagraph, Doors)

**Door Hardware and Locksets** shall be factory finished with medium color anodized Bronzed finish. Match the existing building door hardware and locksets on remodeling projects. Standard size door knob use is encouraged. Interior doors identified for locking shall have locksets compatible with the Base Schlage master keyway system. Main Base Areas use a 6-pin keyway system. Material submittals are required for these items. *Housing Areas use a 5-pin keyway system.* (See Exterior section, subparagraph, Door Hardware and Locksets, for hardware requirements.)

**Millwork:** Cabinets and drawers shall be all wood construction with the same type construction and outside appearance. Quality construction material and hardware which meets the requirements of the Kitchen Cabinet Manufacturers Association (KCMA) A161.1 and Builders Hardware Manufacturers Association (BHMA) A156.9, shall be used. No hardware pulls allowed on cabinet doors and drawer fronts. Hinges shall be European style, concealed, adjustable and self closing type. Drawers shall have metal side slider rails with nylon rollers versus center rails. Countertops and splashes shall be high pressure laminated plastic on particle board. Color shall be subtle basic colors from standard range of colors.

**Bulletin Boards** shall be provided in a central location sized to handle permanent facility signs and posters such as fire exit plans. All permanent notices shall be framed.

**Furniture.** All systems furniture shall be prewired. Panels shall not run past windows and access panels.

**Interior Signs.** See sign section for detailed information



*Typical interior room identification signage.*



*Wood cabinets without exterior pull hardware.*



*Prewired systems furniture.*

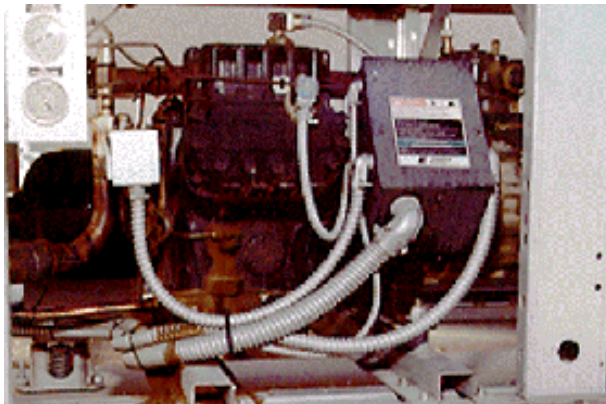




*Electric service entrance equipment.*



*KWH/Demand meter with remote monitoring capability.*



*Flex conduit connecting electrical motor.*

**Electrical Systems** shall comply with the current issue of the National Electric Code (NEC).

**Service Equipment.** Service entrance equipment shall be located in readily accessible spaces to permit quick disconnect of power in case of emergency. The service entrance location shall be coordinated with the exterior power system to ensure that service and feeder circuit lengths are as short as practicable. Low voltage service conductors (600 volts or less) normally shall be installed underground from transformers to service entrance equipment. Services exceeding 600 volts will be limited to large facilities requiring several load centers. The high voltage service conductors shall be installed underground from the transformer to the service entrance equipment. Service equipment ampacities shall be adequate for the estimated load plus 10 to 20 percent for future growth. Generally there shall only be one service disconnect for each facility. At each service entrance provide one KWH/demand meter with remote monitoring capability which can be connected to the Base Supervisory Control and Data Acquisition (SCADA) system. Transformers installed inside buildings shall be the dry type.

**Grounding.** The neutral conductors of all systems operating at 600 volts or less, phase-to-phase, shall be grounded. Grounding electrodes shall be metallic rods not less than  $\frac{3}{4}$  inch in diameter, 8 feet long, driven into the ground at the exterior of the facility. Ground rods may be installed in multiples on a lateral spacing not less than their buried depth. Electrode resistance to ground shall not exceed 25 ohms under normally dry conditions. Communication facilities electrode resistance to ground shall not exceed 5 ohms under normally dry conditions. All grounding type outlets and receptacles shall be grounded by a separate ground conductor. Grounding shall comply with the National Electric Code (NEC) requirements.

**Wiring Systems and Circuits.** Wiring systems shall consist of insulated copper conductors installed in metal raceways except for aluminum conductors of equivalent ampacity, which may be used for copper conductors No. 4 American Wire Gage (AWG) or larger. Branch circuits shall be rated a minimum of 20 amperes. Branch circuit conductors No. 6 AWG or larger shall have heat

resistant insulation. In designing circuits, the combined voltage drop on feeders and branch circuits shall not exceed 5 percent. Minimum raceway size shall be  $\frac{1}{2}$  inch. Raceways used for interior wiring system shall consist of rigid, threaded, zinc-coated, steel conduit; intermediate metal conduit; or electrical metallic tubing. All wiring in transformer rooms shall be in rigid steel conduit wiring troughs or busways. Use of plastic conduit within structures shall be limited to applications below concrete slab-on-grade construction or in highly corrosive, non-hazardous locations. Aluminum conduit shall not be buried in concrete. Flexible metal conduit shall be used for permanent connection to large apparatus and motors where movement may be involved. Flexible metal conduit may also be used for lighting fixture connections above suspended ceilings. All new interior wiring shall be enclosed by the raceway within walls, floors or ceilings.

**Exposed wiring** or carriers are not allowed. Surface mounting may be considered for extreme situations in remodeling projects. Underfloor raceway may be used in large administrative areas where extensive power and communication requirement cannot be adequately served by wall outlets. Busways may be used for feeders and service entrances when they are more economical than equivalent-ampacity insulated conductors in raceways. Plug-in busways may be used in industrial or shop areas to serve a multiplicity of power outlets or motors. Cable trays may be used as a support system for multiconductor type cable such as UF or SE, as permitted by the NEC. A dedicated circuit shall be provided for all computers and sensitive electronic equipment. System furniture to be installed shall have all work stations prewired.

**Motors.** Motors shall have the mechanical and electrical characteristics suitable for the load condition. Motors less than  $\frac{1}{2}$  horse power (HP) shall be single phase. Motors larger than  $\frac{1}{2}$  HP shall be poly phase. Power supplied to the motors shall match the motor voltage rating.



*Exposed electrical wiring or carriers not allowed.*



*Electric motor control center.*



*Motion sensor control switch for lights.*





*4-foot fluorescent light fixture.*



*EXIT light fixture.*



*Sinks in vanities with large full width mirrors.*

**Motor Controllers.** Motor controllers normally shall be of the magnetic, across-the-line type, reduced voltage, and current-limiting type. Motor control centers shall have disconnect switches, branch circuit overload protection and controller mounted in a single assembly to serve several motors which are grouped in a particular area. Motor control circuits shall not exceed 120 volts to ground. For ground-neutral systems, the neutral conductors shall be directly connected to the started coils.

**Lighting** illumination levels for general office work areas shall be 50 to 70 foot candles. Individual task lighting may be sized to meet the particular function. Hallways and stairwells shall have lighting levels of 20 foot candles at floor levels. Photoelectric switches, motion sensors and timing devices shall be used to turn off the lighting when areas are not in use.

**Light Fixtures.** Fluorescent lamps shall be used to the maximum extent practicable. Fluorescent fixtures shall normally be the 4-foot type fixture. Locations and spacing of fixtures shall be coordinated with structural, mechanical and other building trades. The use of wrap around lenses on fluorescent fixtures is discouraged due to the potential breakage of lenses and hinges experienced with normal lamp replacement. Use of incandescent fixtures is discouraged due to energy conservation. Fluorescent lamps for electronic ballast shall be energy efficient types and shall be 25 watt F25, T-8 for 3-foot lamps, and 32 watt F32, T-8 for 4-foot lamps. Normal operational input voltage shall be 120 or 277 volt. Starters shall be rapid or instant type.

**Ballast Type.** Ballast shall be the electronic type consisting of a rectifier, high frequency inverter, and power control and regulating circuitry. The ballast shall be Underwriters Laboratory listed, class P, with a class A sound rating and free of PCB compounds. The minimum number of ballast shall be used to serve each individual fixture using one, two, three or four lamp ballast. A single ballast may be used to serve multiple fixtures if they are continuous mounted, and factory manufactured for that type of installation.

**Exit and Emergency Lighting.** Exit and emergency lighting shall be provided as required by National Fire Protection Association (NFPA)



Number 101. Exit lights shall be energy efficient, long lasting light emitting diode (LED) technology type. Emergency lighting shall be provided by integral battery operated, fixed lighting units.

**Toilet Compartments** in all administrative facilities shall have sinks in vanities. Free standing sinks are not allowed. Large full width mirrors shall be provided over the vanities. Small industrial mirrors over each sink are not allowed. Partitions shall be constructed of metal. Toilet partitions shall be floor-mounted. The partitions shall have a baked enamel finish in colors selected from standard colors of the manufacturer. Toilet specialty items shall be provided as required.



*Toilet Partitions -floor-mounted.*

**Mechanical Systems.** The selection of all mechanical systems shall conform to the Edwards AFB Design Standards.

**Plumbing Fixtures and Systems** shall be low-flow type conducive to water conservation. Washerless type fixtures shall be specified. *Residential Water Closets shall be tank type.* Other living areas such as Dorms and TLFs shall also have tank type water closets. Copper piping is recommended where feasible. All piping systems shall be marked with identification tapes. Plumbing fixtures shall consist of the following items:

- 15-inch standard floor-mount flush valve water closet with open front seat without a cover.
- 18-inch handicap floor-mount flush valve water closet with open front seat without a cover.
- Countertop lavatory with self-closing faucets.
- Countertop lavatory with lever handle faucet and gooseneck spout.
- Electric water cooler mounted at handicap height.
- Waterless urinals, odorless no-flush, no water connection, sanitary white with 3-year limited warranty, model number 2003 Kalahari, manufactured by Waterless Company or equal.



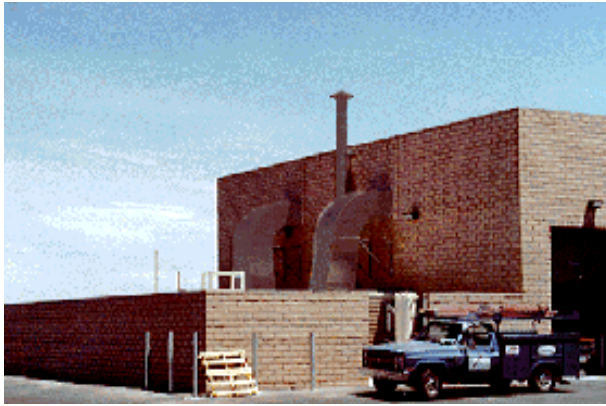
*Water Closet -flush valve, floor-mounted.*



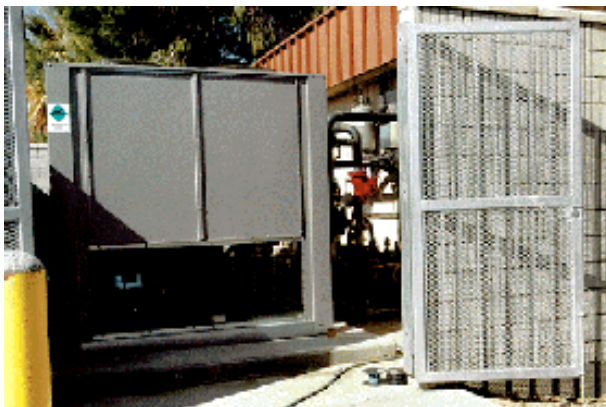
*Electric Water Cooler -handicap height.*

**Heating, Ventilation, and Air Conditioning (HVAC) Systems** shall not be installed with exterior exposed ducting. General system design weather data including summer and winter dry bulb temperatures of 102 and 22 degrees Fahrenheit respectively at the 97½ percent





*Exterior exposed HVAC ducting not allowed.*



*HVAC equipment.*



*Water cooling towers for air conditioning.*

level, summer wet bulb temperature of 67 degrees Fahrenheit, and bin temperatures as detailed in AFM 88-29.

**Fuels.** Natural gas is the preferred fuel for heating systems. Use of fuel oil for heating systems is discouraged due to environmental concerns. Propane gas or heat pumps with supplemental electric heating are alternative heat sources for remote areas where natural gas is not available. Use of passive solar systems is encouraged.

**Equipment.** HVAC equipment shall meet the efficiency standards identified in ASHRAE/IES 90.1, 1989, and California Title 24.

Multiple loop chilled water systems are encouraged due to lower overall energy demand being generally less than single loop type systems. The primary, constant volume and low head inner loop should circulate chilled water through the chiller, and the secondary outer loop should provide chilled water at constant differential pressure to the various coils.

Water-cooled chillers are encouraged for Base use due to lower demand charges, lower kilowatt consumption per ton of air conditioning, and higher overall operating efficiencies. Life cycle cost studies are encouraged to look at energy consumption, initial costs, and operating expenses for air versus water-cooled air conditioners.

Air side economizers shall be provided for air handling units over 2,500 cubic feet per minute (CFM), and a total cooling capacity over 75,000 British thermal units per hour (Btu/h), in accordance with California Title 24. Water side economizers using cold “free” cooling condenser water during winter or cold evenings, in selected facilities such as data processing centers, are encouraged.

Chilled water storage systems are encouraged to reduce expensive peak demand charges on electrical consumption.

Use of chlorofluorocarbon (CFC) refrigerants is limited in HVAC systems in accordance with Engineering Technical Letter 91-7.

Electronic control devices shall be installed in all new construction. Use of setback type electronic thermostats with clear plastic lockable covers is encouraged. Each conditioned space shall include a manual override of setbacks when the system is controlled by a central timer.

**Energy Management Systems.** Equipment terminal connections shall be provided for connecting future Energy Monitoring and Control (EMCS) or Supervisory Control and Data Acquisition (SCADA) systems to control panels for air handlers, chillers, boilers, pumps, etc., in accordance with Tri-Service Manual for EMCS. This shall include remote reset temperature controls, equipment status, etc., but shall not include isolation amplifiers, relays, etc.

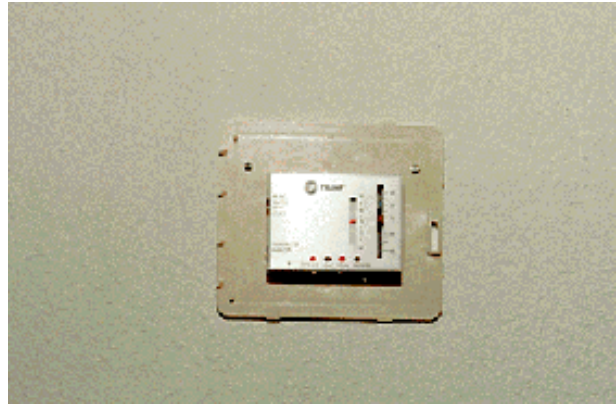
### Energy Monitoring and Control System

**General.** The system shall provide operator interaction and dynamic process manipulation, including overall system supervision, coordination, and control. Reused data shall be obtained from the remote control unit (RCU) and multiplexers (MUX). RCUs shall manage all control function within their data transmission media (DTM) environments. The central control unit (CCU) shall communicate with the RCUs. There is an existing CCU located at Building 3500.

**RCUs** shall be processor-based. Each RCU shall have a minimum of 10 percent of each In/Out (I/O) function as expansion capacity beyond the total number of points implemented. Output relays associated with digital signals shall be considered as part of the I/O function. Control drive circuitry shall be designed so that a single component failure in the RCU does not cause faulty operation (uncommanded output operation). Power supply shall be 120 volts AC and at 60 Hz.

**RCU Control.** The RCU shall include the following controls:

- Main power switch
- On-Off switch
- Self-test switch
- Reset Switch
- RCU remote local switch
- RCU outputs disable switch



*Electronic control device.*

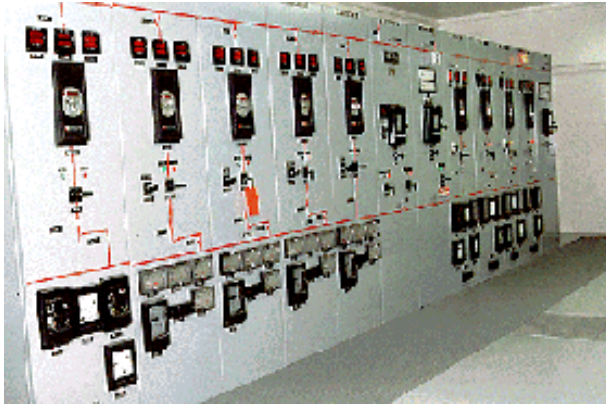


*EMCS/SCADA office -Building 3500*

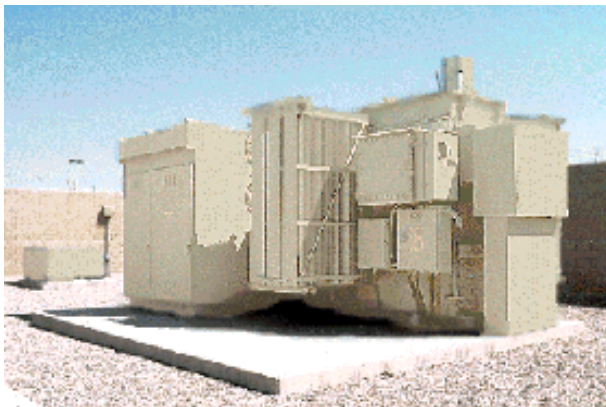


*Electrical switching station with SCADA system.*





*Electrical Switching Substation -control panel with SCADA system.*



*Electrical Substation Transformer -with SCADA system.*



*Electrical Substation -control panel with SCADA system.*

**RCU Battery Backup.** A sealed maintenance-free battery backup system sufficient for at least 8 hours shall be provided.

#### **RCU I/O Functions.**

**Analog Inputs (AI).** The AI function shall monitor each analog input, perform analog-to-digital conversion and hold the digital value in a buffer for interrogation.

**Digital Inputs (DI).** The DI function shall accept Form A DE on-off, open-close, or other two state data indication.

**Digital Output (DO).** The DO function shall provide contact closure for momentary and latched operation of output devices.

**Instrumentation and Control.** The following electrical power instruments may be connected to a RCU: voltage transformers, current transformers, voltage transducers, trip indication relays, and voltage relays.

**CCU.** The CCU shall function as the overall SCADA/EMCS system coordinator. It shall perform supervisory control and data acquisition functions, perform automated energy management functions, control peripheral devices, and perform calculation associated with operator interactions. The CCU shall be a single manufacturers standard unmodified digital computer. The CCU shall function as a communication controller, shall reformat and buffer data, and shall perform error checking and retransmission of data between the CCU and the RCU through the communication link termination (CLT).

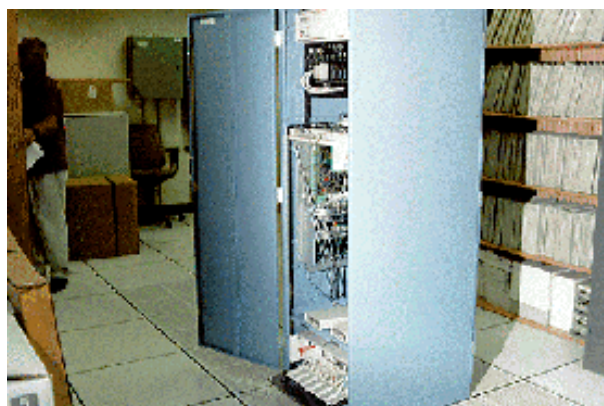
**Communication Link Termination (CLT).** The CLT shall include multiplexes, modems or other line termination for reference between the communication systems master control room from fiber optics (FO) communication terminal and the CCU. Provide signal processing and conditioning at the CLT for bridging, padding, impedance matching, and amplifying to maintain the signal integrity.

**Central Communication Controller (CCC).** The CCC shall function as a front end communication processor. It shall reformat and buffer data, perform error checking and retransmission of data between the CCU and the RCUs through the CLT. The CCC shall be a physical part of the CCU.

**Real Time Clock (RTC).** The CCU shall have a RTC to interrupt the processor at regular intervals. The CCU shall maintain seconds, minutes, hours, date, and month.

**Power Failure and Automatic Restart.** In the event of a power failure, means shall be provided to perform an orderly shutdown of the CCU and its peripherals without loss of contents of memory, registers, and program status. After power is restored, the system will automatically obtain all date and time data from the system real time clock and will perform an automatic restart.

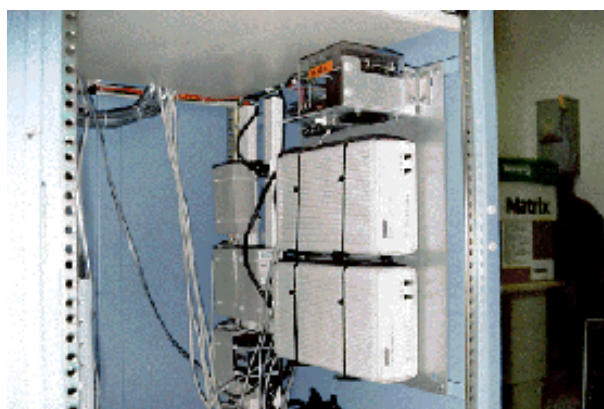
**Memory Protect Power Supply.** Where volatile memory is used in the CCU, battery backup sufficient to maintain the contents of all volatile memory shall be provided.



*Communications Cabinet -components, Building 3500.*

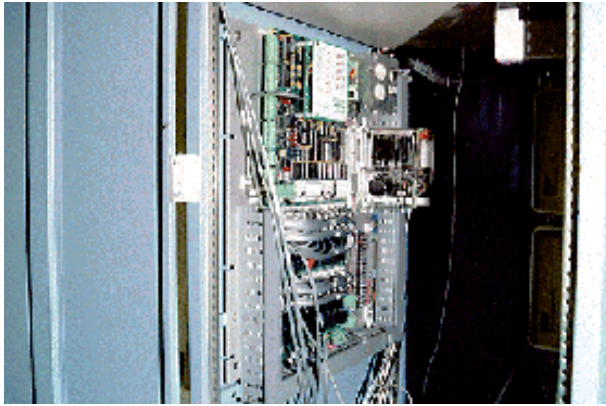


*Communications Cabinet - T-1 shelf incoming communications.*

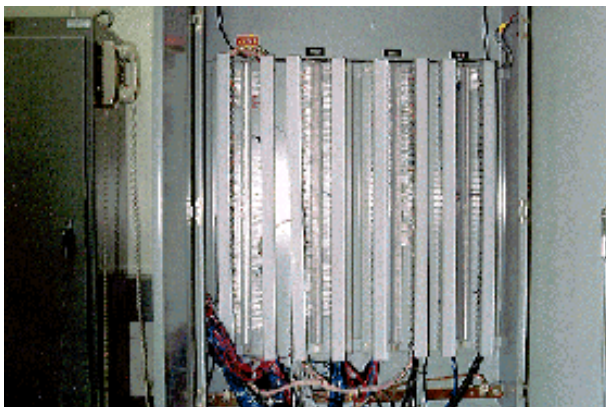


*Communications Cabinet -communication modems.*

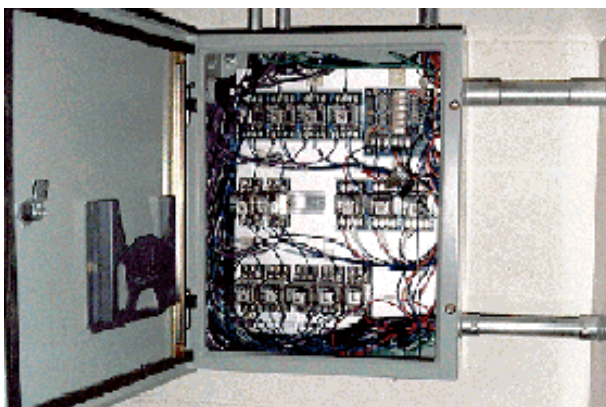




*Communications Cabinet -remote terminal units (RTU).*



*SCADA Interface Cabinet -terminal point.*



*EMCS Relay Control Cabinet -components.*

**Disk Storage System.** The CCU shall be connected with a rigid disk system. The disk system shall consist of one or more disk drives. In addition, the disk system shall have 100 percent expansion of the disk resident data base.

#### **Data Transmission System.**

**General.** A FO digital data transmission system shall be used for communications between the CCU and the RCU. The data transmission system shall consist of multiplexer (MUX), modems, FO transmitter, and receiver modules, repeaters, FO cable, power suppliers, and power line surge protection.

**Environmental Requirements.** Indoor equipment and wiring shall be rated for continuous operation under ambient environmental condition of 0 to 125 degrees Fahrenheit dry bulb and 10 to 95 percent relative humidity, noncondensing.

**Expansion Requirement.** The data transmission system shall be expandable. Expansion shall be accomplished by addition of plug-in modules along with an addition of FO links from new RCU to CCU.

**FO Modems.** The modems shall allow full duplex asynchronous point-to-point communication using a FO pair.

**FO Transmitter Module.** The FO transmitter shall accept electronic digital signals and shall modulate a light emitting diode (LED). The LED shall be coupled into an FO cable.

**FO Receiver Module.** The FO receiver module shall receive light from the FO cable and shall convert this light into an electronic digital signal identical to the electronic signal applied to the FO transmitter modules.

**FO Multiplexers (MUX).** The MUX shall allow full duplex communication between the master control room and the field equipment. The MUX channel expansion shall be by the addition of plug-in MUX channel boards. Channel racks shall be provided for future plug-in MUX channel. A minimum of 50 percent spare channel spaces shall be provided.

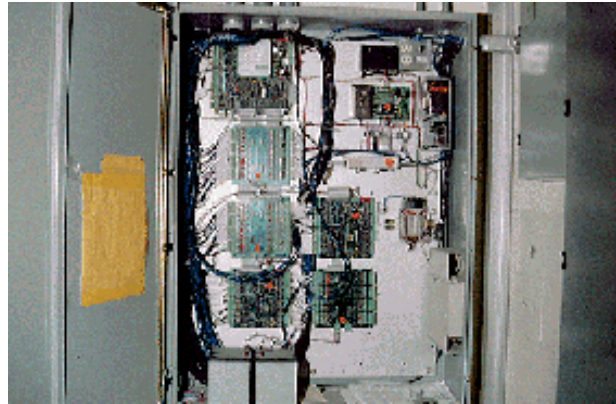
**FO Cable.** The cable shall contain a minimum of two fiber optic conductors for full duplex operation. One pair spare fibers shall be provided. Each fiber shall be protected by protective tubing, a jacketed strength members and an exterior jacket. The conductor shall be multimode, grade index, solid glass waveguides. All cable shall be from the same manufacturer, of the same cable type, and the same size.

**FO Connectors** shall be field installable, self-aligning and centering.

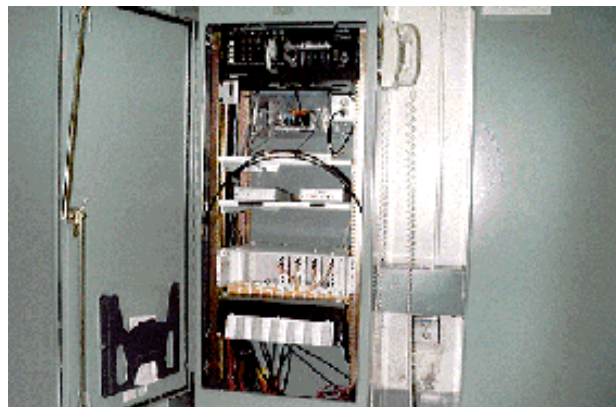
#### **Communications Requirements.**

**Communications Prewiring** shall be provided as noted below to meet the Base Communications Squadron requirements. Contact the Base Communications Squadron for additional details.

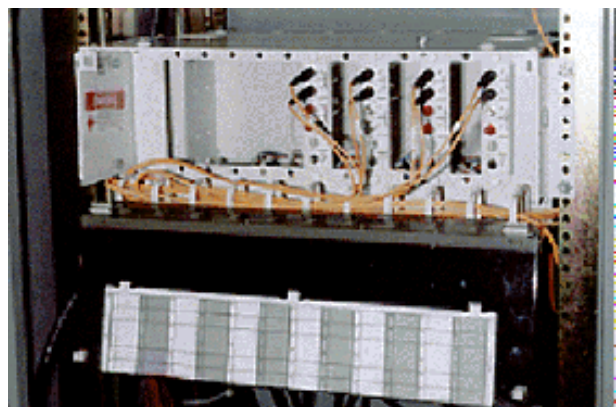
**Building and Facility Wiring.** This section defines the generic telecommunications wiring system for buildings. The telecommunications system should be integrated to save the specialized resources which are necessary to support such a system.



*EMCS field interface device components.*

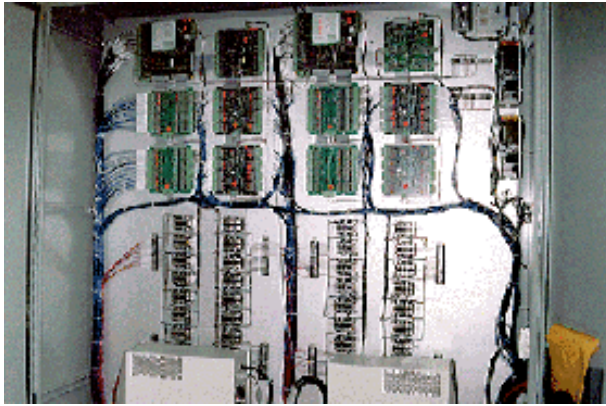


*SCADA communications cabinet components.*

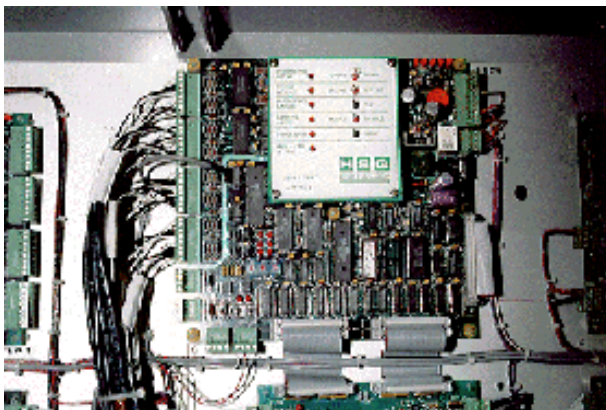


*SCADA communications cabinet -fiber optics system.*





*SCADA field interface device components.*



*SCADA field interface device -RTU.*



*Communications System - Telecommunication outlet.*

**Telecommunications Outlet.** The objective of the Telecommunications Outlet is to provide a consistent flexible method of connecting end stations to the network.

**Baseline Configuration.** Currently the method of connecting end stations to the Base network varies greatly from building to building. Experience has shown that the physical cable which connects to the client's workstation is the portion of the network which will experience the majority of failures. This is largely because of the wear and tear presented to the cable at that point in the network. A telecommunications outlet in close proximity to the client's workstation provides flexibility to the work area. The addition of a telecommunications outlet also allows for future moves, adds, and changes without totally redoing the network cabling infrastructure.

**Connectivity.** The telecommunications outlet provides the middle man interface between the client's workstation and the Network Equipment Room. A simple coax or an unshielded twisted pair (UTP) jumper cable is used between the telecommunications outlet and the client's workstation.

**Maximum Distance.** The maximum distance between the telecommunications outlet and the workstation is 3 meters (9.8 feet).

**Types of Media.** The telecommunications outlet shall provide for four category 5 UTP RJ45 connections, one RG59 F type connector, and two 62.5/125 micron ST fiber optic connectors.

**Horizontal Wiring.** The horizontal wiring is the portion of the telecommunications wiring system that extends from the work area tele-communications outlet to the telecommunications closet. The horizontal wiring includes the cable from the telecommunications outlet, the mechanical termination for the horizontal cables, and cross connections located in the telecommunications closet.

**A Cabling Scheme** shall be provided which will facilitate ongoing maintenance and relocation as well as being adaptable for future equipment and service changes.

**Support.** No support is available for horizontal wiring.

**Connectivity.** The horizontal wiring provides the connectivity between each work area tele-communications outlet and a telecommunications closet. Wiring between telecommunications closets is not considered horizontal wiring— this is an Intrabuilding Backbone. No electrical components shall be installed as part of the horizontal wiring, these types of components shall be placed external to the telecommunications outlet or the cross connect located in the telecommunications closet.

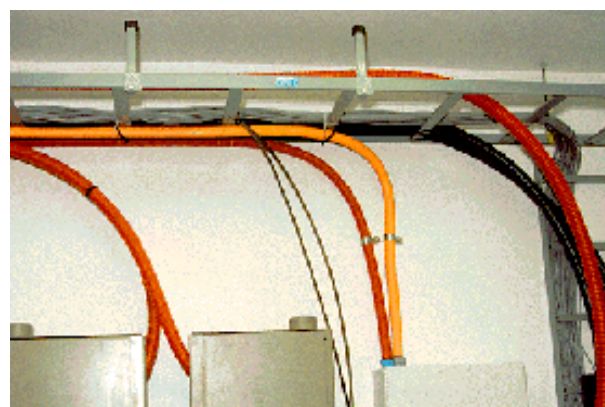
**Maximum Distance.** The maximum distance for a horizontal cable run shall not exceed 90 meters (295 feet) regardless of media type. This distance takes into account an allowance for 3 additional meters (9.8 feet) from the telecommunications outlet to the workstation.

#### **Telecommunications Rooms\Closets.**

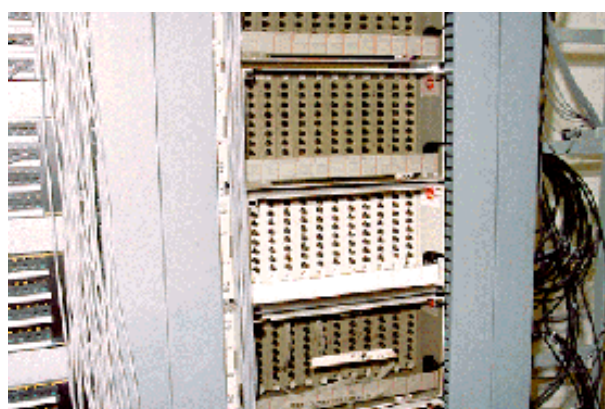
The telecommunications closet is an area within a building set aside for the exclusive purpose of housing equipment associated with the wiring system. Every building should contain at least one telecommunications closet or equipment room or entrance facility. There is no limit on the number of telecommunications room which may be provided within a building. The telecommunications closet must provide space, power,



*Communications - wiring conduits installed during project construction.*



*Communications - system horizontal wiring.*



*Communications - fiber cabinet systems components.*





*Sprinkler System.*



*Fire Hydrant -painted big stone brown.*



*Fire Extinguisher cabinet.*

grounding, cooling, and lighting for the devices used to interconnect the horizontal wiring system to the backbone wiring system. The telecommunications closet must be dedicated to the telecommunications function - it should not be used as a coat closet, break room, office supply storage or any other non-telecommunications purpose. Electrical power for the tele-communications room must not be shared with any other electrical power requirements for the building.

## Fire Protection Systems

**Fire protection/detection** fixtures shall be painted the color of the adjacent surface they are mounted on with the exception of "pull boxes".

**National Fire Codes.** The most current edition of the NFPA standards in effect during the planning design phase shall be used throughout the life of the project.

**System Requirements.** Fire protection systems shall be installed as directed by MIL-HDBK-1008B, Fire Protection for Facilities Engineering, Design and Construction. Fire Protection Systems for aircraft hangars shall be per Engineering Technical Letter (ETL) 96-1 Fire Protection Engineering Criteria - New Aircraft Facilities. This document also addresses existing facilities in certain circumstances. Where specific installation guidance is not provided, refer to the appropriate NFPA standard.

**Fire Hydrants** shall be Jones wet barrel type or an approved equivalent. Color shall be dark brown *Big Stone* from the Fuller O'Brien Paints color palette, with a two inch band of color matching reflective tape. Hydrants shall have two 2½-inch outlets and one 4½-inch suction connection with national standard fire hose threads. Hydrants shall be installed in accordance with MIL-HDBK-1008B. Hydrants shall be above-ground type with a maximum height of 36" inches. Blue reflectors "frogs" shall be installed in the street paving.

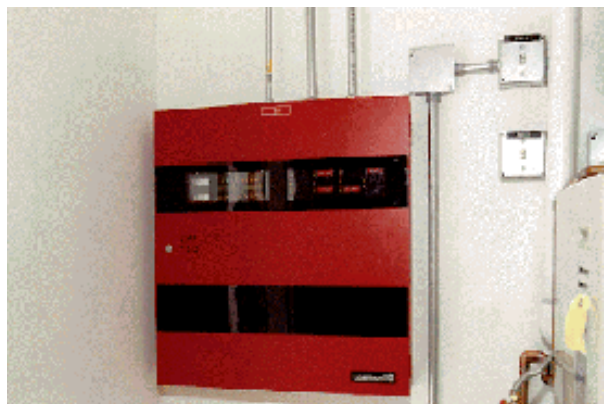
**Fire Extinguisher** cabinets shall be sized as a minimum, 23 inches high, 10 inches wide, and 8 inches deep, clear dimensions. Cabinets shall have a door with

a handle for access to extinguishers. Cabinets requiring glass to be broken to access extinguishers are not acceptable. Cabinets shall be fully recessed on new construction or semi-recessed on remodeling and shall be spaced to comply with the NFPA 10.

**Fire Alarm Systems.** New fire alarm systems (FAS) and modifications to existing FAS shall be reviewed by Civil Engineers Alarm Element and Fire Technical Services. Alarm control panels, sensors, wiring, power supply, communications link and other materials or work involved with the FAS shall be as required by the civil engineering group. Initiating device circuits shall be Class A, Style D. Notification appliance circuits shall be Class A, Style Z. Fire alarm control panels (FACPs) shall incorporate a walk test feature for each initiating device circuit. The FACP shall incorporate an alarm verification feature for each initiating device circuit. The FACP shall incorporate a duct detector reset capability for each duct detector. Each junction box supporting the fire initiating and notification circuits shall be red in color. The minimum wire size for each detection and notification circuit shall be 14 AWG stranded. Wire shall be bunched, tinned, stranded copper labeled FPL, POWER LIMITED FIRE PROTECTIVE SIGNALING CIRCUIT CABLE. Contractor shall not allow foreign voltage within the FACP. The contractor shall label, with the FACP, each initiating device and notification appliance circuit as to its area of responsibility. Indicate the location of duct detectors concealed by walls or ceilings or below false floors. This indication shall be at the point of concealment. Wiring shall be inspected prior to being concealed by walls. Intelligent panels shall not require a purchase of new software in the event of changes to the system. The intelligent FACP shall be capable of having troubleshooting conducted by a NBFA level 2B technician without requiring additional training. Manuals and any equipment required for software modifications and troubleshooting, e.g., lap top computers shall be provided to 95 CEG alarm shop at the time of system acceptance.

**Transponder.** The Morse SPT 5023/5026 transponder is the Base standard for transmission of fire/trouble alarms to the Fire Department Communications Center. 95 CEG alarm shop must be contacted to provide a letter authorizing the contractor to purchase this device.

**Fire Alarm Manual Pull Stations** shall be double action types with a no break glass feature. Color shall match adjacent wall except for pull handles which shall



*Fire alarm system panel.*



*Morse transponder for fire alarm system.*



*Morse transponder for fire alarm system.*





*Fire alarm audio/visual type.*

be red. Manual pull stations shall be provided in each boiler, electrical, and mechanical room.

**Fire Alarm Notification Devices** shall be audible/visual type. At least one visual alarm shall be placed in every occupiable room in a location that can be seen from all points in that room. Where this cannot be accomplished with a single device, provide as many devices as necessary to accomplish the requirement. Only visual alarms shall be placed in restrooms. Audible devices shall be spaced so that they can be clearly heard from any room in the facility with doors closed. Place an audible/visual device in each boiler, electrical, and mechanical room.



*Elevator conveying system.*

**Smoke Detectors** shall be installed on all air handlers in accordance with the Uniform Mechanical Code (UMC) and NFPA. Separate smoke detectors shall be installed on the supply and return air ducting. The smoke detectors shall automatically shut down the air handlers when they detect smoke. Corridor smoke detectors shall be installed per milhdbk 100813.

**Emergency Lighting** shall be installed per ETL 94-5 and NFPA 101 requirements. Where emergency lighting is integral with lighting fixtures, the metal frame of the fixture shall be labeled "Emergency Light" to aid in quick identification for maintenance purposes.

**Exit Signs** shall be LED type. Colors shall be red or green in compliance with NFPA 101. Install in accordance with ETL 94-5 and NFPA 101.

**Conveying Systems.** Equipment will be selected on a case by case requirement to meet the specific function intended for the system. Good quality conveying systems shall be provided to reduce life cycle maintenance costs.



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**Demolition.** Surveys checking for asbestos and lead/chromium-based paint shall be completed prior to start of demolition. The general policy is to remove all items for disposal during demolition of buildings. Specific items warranting salvage or re-use are to be identified in special cases only for projects. See Exteriors section, subparagraph, Landfill Use Module Procedure, for requirements on use of Base landfill.



## SIGNS

### FUNCTION

Signs on Edwards AFB should provide information required to guide a first-time visitor on the Base to a particular destination, and provide information about specific places or events.

### INTENT

The use of a standard method of providing Base information on signs reduces confusion for the people relying on them for guidance.

### GUIDELINES

**General.** All permanent signs shall conform to the standards identified in this guide. All sign lettering shall be *Marble Creme* with a dark brown *Big Stone* background.

**Medium Profile Signs.** Type D1 (AFMP 88-40) signs shall be used along roadways when vehicular speed is in excess of 25 MPH. Type D2 signs shall be used when vehicular speed is less than 25 MPH. All information needs to be complete and concise.

**Traffic Signs.** Only traffic signs are permitted to be mounted on posts which are two inches square and shall be covered with dark brown *Big Stone* colored plastic or vinyl sleeves. The back of the signs shall be colored dark brown *Big Stone*. All traffic signs shall conform to the National Traffic Control Standards.

**Building Names and Addresses** shall be located on the wall of the building adjacent to the front entrance. The building name shall identify the organization located in the building. The letters shall be raised and sized to coordinate with the overall area they are located in, with street visibility a primary consideration. The address numbers and letters shall be smaller than the building name letters. The letters shall be cast aluminum or similar high quality letters. The letters shall be colored dark brown *Big Stone*. The names of the organization offices may be located on glass entrance doors with 3-inch maximum letters.



*Medium profile information sign.*



*Traffic sign with brown back and post.*



*Building name on wall with raised lettering.*



*Base entrance sign.*



*Directional sign lettering.*



*Commercial sign.*

**Marquee Signs** shall be limited to electronic digital type signs with siting approval required through the Base Civil Engineer Office. Care shall be taken when specifying future electronic sign equipment to ensure compatibility with the remote control capability already established for the existing marquee signs.

**Base Entrance Signs** shall conform to AFP 88-40 and shall be modern in design.

**Reserved Parking Signs** shall consist of the word "Reserved" and an identification number. Both shall be painted on the pavement of the parking slot with white paint. The identification number is a control number use by the facility manager.

**Handicap Parking Signs** shall consist of the international handicap symbol painted in white on the pavement of the parking slot. Do not use post-mounted signs.

**Temporary Signs** shall be limited to a case-by-case approval by the Base Civil Engineer Design and Construction Flight Office. Signs shall have all information on one sign where feasible and be made with dark brown letters on a tan background.

**Commercial and all Other Signs** shall conform to AFP 88-40 with the exception of color. Framing shall be steel tube column painted *Big Stone* brown. Eliminate "Dog Ears" shown in frame construction in AFP 88-40.

**Sign Restrictions.** All signs on Edwards AFB shall be approved by the Base Civil Engineer Design and Construction Flight Office prior to installation.

**Color.** Directional and information signs shall have *Marble Creme* letters on dark brown *Big Stone* background. Raised lettering on buildings shall be dark brown *Big Stone* color. Organizational information signs on glass doors shall have *Marble Creme* letters.

**Lettering.** Sign lettering shall be in accordance with AFP 88-40 with the exception of the color.

**Emblems.** Organizational emblems shall be limited to a 6-inch diameter emblems on the glass entrance doors to the organization buildings.





**Layout** of sign faces shall have all lettering left justified. Commercial signs shall conform to AFP 88-40.

**Sign Installation** shall normally be accomplished by the Base Civil Engineer Shops. All signs being installed by other organizations or contractors require prior approval of the Base Civil Engineer Design and Construction Flight Office.

**Street Signs** shall be in accordance with AFP 88-40 and shall have white reflective lettering on dark brown *Big Stone* background, both sides. Lettering shall be 4" high with secondary designations being 2" high or larger. AFMC insignia shall be 4" by 4" in size. Sign posts shall have vinyl covers.

**Interior Signs** shall be provided for all rooms in new construction as required by AFP 88-40.

Building Directories shall be provided at the main entrance of all buildings. Floor directories shall be located at the top of stairways and at elevator lobbies. The size, type, information, etc. shall be as required by AFP 88-40. Lettering and background coloring shall be *Marble Creme* on *Big Stone*.

Room signs shall be 9" by 5" changeable message plaque type signs. The plaque shall be dark brown woodgrain with white letters. The room name/number shall be one inch high. The changeable portions shall be 1" high and shall slide into the slot provided.

The sign shall be mounted on the wall on the strike side of the door per AFP 88-40 and ADA requirements.

Restrooms or other rooms requiring access by the handicapped shall have signage as required by ADA Handbook appendix b.



*Temporary sign layout.*



*Organization information on glass.*



*Street sign.*



*Primary Road -Rosamond Boulevard.*



*Secondary street -Fitzgerald Boulevard*



*Main entrance to Edwards AFB.*

## ROADS

### CROSS REFERENCE

Construction details maybe found in the California Department of Transportation highway design manual standard plans book.

### FUNCTION

Roads should provide a circulation hierarchy that effectively separates public, private, and service vehicular traffic.

### INTENT

These guidelines are intended to minimize disturbance by roads to the natural setting and to provide standards for construction.

### GUIDELINES

**Layout and Siting.** Create roads parallel to contours whenever possible to reduce erosion, visual impact, and grades. Preserve rock outcroppings, natural drainage patterns, and vegetation when siting new roads.

**Road Hierarchy.** There are three levels of road hierarchy: primary, secondary, and tertiary. Develop each for the appropriate function.

**Primary Roads** connect Edwards AFB components such as the flightline, Engineering and Administration, and support areas to entry points.

**Secondary Roads** connect Edwards AFB components to one another and support facilities such as commercial or housing areas.

**Tertiary Roads** are unpaved access roads or residential streets within the housing areas. Consolidate existing access roads to minimize site impacts whenever possible.





**Road Types.** There shall be two types of roads constructed on the Base. One type is highways which shall be constructed with shoulders. The other type is streets which shall be constructed with curbs and gutters. The minimum paved lane width shall be 12 feet, with attached minimum 3-foot-wide paved shoulders and 5-foot-wide compacted gravel shoulders. The edge of the gravel shoulders shall be tapered to the drainage channel. A minimum width two-way traffic lane shall be configured with a 3-foot shoulder on either side of two 12-foot-wide lanes. There shall be 30 feet from curb to curb or pavement to pavement edge. The minimum width of a two-way traffic lane with parking permitted on one side shall be 36 feet.

**Entrances.** Main entrances to Edwards AFB shall be constructed and maintained to ensure that the Air Force security requirements are met and the entrance is aesthetically pleasing.

**Service Access.** Service drives may be provided through parking areas when appropriate.

**Loading Docks.** Create loading docks for the vehicles being served. Screen docks with architecturally compatible walls, fencing or plants.

**Recessed Reflectors.** All road pavements shall have centerline and lane divider recessed reflectors at 40-foot intervals. All pavements without curbs and gutters shall have recessed reflectors on the edge of the lane. Provide blue recessed road "frogs" in the pavement at fire hydrants.

**Utilities** shall not be installed under paved roads when it can be avoided per ETL 88-4. Utility line conduits may be provided under roadways in new and major construction areas.

**Intersections.** Create and maintain unobstructed lines of sight at intersections beginning at 45 feet from each intersection corner. This area forms a triangle which must be clear from 2 to 6 feet in height. Provide intersections with appropriate radii based on the type of road and vehicle.



*Highway type road with shoulders.*



*Curb and Gutter at Dorms.*



*Clear lines of sight at intersections.*



*New concrete curbs at intersection.*



*Galvanized steel guard rails and pressure-treated posts.*



*Bollards at beginning of bicycle trail.*

**Curbs.** All curbed roads, streets, and parking lots at Edwards AFB shall be constructed with two types of curbing. The types of curbing shall be header curbs or Type B roll curbing (see subparagraph Roll Curbing). Curbing will be replaced by section as defined by expansion or control joints. Curbing shall be constructed with a single pour with no joint between the curb and gutter. Curb transitions shall feather into the ground at end points. Rural gravel roads shall not have curbing.

**Header Curbs** are the standard type curbs at Edwards AFB and are to be used to define road edges, protect the paving, and preserve existing drainage patterns.

**Roll Curbing** is preferred for drainage problem areas; however, this type of curbing is generally not used at Edwards AFB. Do not use block curbing or high profile curb and gutter to control traffic and access. Do not paint curbs. (See Signing section guidelines for exceptions.)

**Guard Rails** shall conform to those used by the State of California. They are galvanized steel sections mounted to unpainted, rectangular, pressure-treated timber posts. Include reflective tabs, the same color as guard rails on guard rails for nighttime safety.

**Bollards** shall be metal painted dark brown *Big Stone* when 20 feet or more from any facility. Bollards closer than 20 feet shall match the color of the item they protect. They may also be smooth cast stone with integral color. Two each, 4-inch-wide bands of matching color reflective tape shall be installed near the top and mid-height of the bollard.

**Lighting.** Lamp types shall be high pressure sodium. Street lights shall be located at intersections, curves, and other potentially dangerous areas. (See Lighting, subparagraph Lamp Types.)

**Expansion and Control Joints** shall be “Felt Type” and shall be installed in curbing and concrete paving as required to prevent cracking.

**Cutting of Pavement.** Roads are not to be cut without permission of Base Civil Engineer, Chief Engineering Division or higher. The standard is to bore or jack conduits and pipes under roads versus cutting the pavement.





**Erosion Control.** Elements for erosion control such as catch basins and concrete swales, shall be similar in material and form. Do not allow water to drain across asphalt paving.

**Aprons.** Develop asphalt or concrete aprons at intersections of paved and unpaved roads as a transition, and match the material of the paved road. Aprons shall be 50 feet long. Provide mud guards where required.

**Road Base.** Use gravel road base where unpaved roads are subject to erosion, and to lessen maintenance requirements.

**Shoulders.** Roads shall have a minimum 8-foot-wide paved shoulder with header curb.

**Crosswalks.** Provide crosswalks where sidewalks intersect roads. The Base standard for defining crosswalks is 12-inch-wide striping, 6 feet apart, placed perpendicular to the curb. Use paint rather than reflective material.

**Pavers** shall be used in areas such as sidewalks, entryways, Base standard shade structures, "Airman's Walk," and street crossings. Pavers shall be used for accent and esthetics value. Pavers shall be brick colored, rectangular, concrete paver bricks, Orion or equal. Pavers shall be laid in a herringbone pattern and contained by concrete borders.



*Typical street light at intersection.*



*Pavers.*



*Typical crosswalk.*



*Parking area for military dining hall patrons.*



*Parking area for dormitory residents.*



*Parking at family housing area.*

## PARKING

### CROSS REFERENCE

Construction details maybe found in the California Department of Transportation highway design manual standard plans book.

### FUNCTION

Surface lots are provided for short or long term storage of vehicles at housing, mission, or support facilities.

### INTENT

Parking lots should be as unobtrusive as possible while providing safe and convenient parking for their users. These guidelines are intended to minimize the visual impact of parking lots and provide standards for planning.

### GUIDELINES

**Planning.** Parking areas are to reinforce the experience of arrival at a pedestrian place. Provide a separation or transition between the parking area and the road or facility (e.g., sidewalk, median, or parking free zone). The relation between the facility and the road must be considered. Create parking areas that will serve two or more vehicles.

**Family Housing.** *Parking shall be provided in carports and driveways; on-street parking is not encouraged. In addition to driveway parking, provide off-street parking, housing clusters at 2 spaces per unit.*

**Siting.** Site parking areas for minimum disruption of soil, vegetation, and drainage. Select a layout for parking that makes most efficient use of the natural environment. Natural screening and berms shall be used around parking lots. No parking in front of buildings.





**Service Access.** Provide access to service areas and dumpsters through parking areas when appropriate. Keep this access as distant from the main entrance of the facility as possible. Separated service drives are encouraged. Keep dumpster enclosures at least 15 feet from buildings and provide a 20-foot overhead clearance for trash vehicles. Pads should be 6 inches thick.

**90-Degree Parking** is preferred for Edwards AFB and requires the least land for a given number of vehicles.

**60-Degree Parking** requires one-way traffic lanes, allows easier maneuverability, and may be desirable for use in the community service areas.

**Off-Street Parking** areas are preferred. On-street parallel parking spaces are discouraged and shall not be counted toward meeting facility requirements.

**Reserved Parking.** Reserved parking signs shall have the word "RESERVED" with the control number painted below it directly on the pavement. Refer to Signing section for guidelines.

**Vehicle Size.** Always consider the sizes of the vehicles to be served and Base parking modules on the standard dimensions of those vehicles; e.g., automobile 9 by 19 feet, motorcycle 4 by 8 feet, bicycle 3 by 5 feet, bus 12 by 30 feet.

**Military and Oversized Vehicles.** Most military vehicles can be accommodated in standard sized parking lots. Develop specially assigned areas for oversized vehicles.

**Motorcycle and Bicycle Parking.** Designate adequate space for motorcycle and bicycle parking near building entrances within the vehicle parking lots. Provide concrete pads for motorcycles. Provide a system for securing bicycles at all parking areas to encourage their use. Use bollards to protect bicycles from vehicles.

**Drainage.** Provide a minimum of 1 percent slope for all paved surfaces and 2 percent for grassed lots. The maximum slope allowed for either surface is 6 percent.



*90-degree parking slots.*



*60-degree parking slots.*



*Motorcycle parking slots.*



*Wide sidewalk allows for bumper overhang.*



*Fire lanes in parking area.*



*Erosion Control -water channeled to naturally occurring drainage basins.*

**Erosion Control.** Properly sited parking lots should maintain the existing patterns of drainage. Create erosion control structures such as catch basins, culverts, and concrete swales, to channel water to storm sewers or naturally occurring drainage basins. Consider the drainage impacts down stream.

**Curbing and Sidewalks.** Curbing is to be used in every parking lot. The use of wheel stops will not be allowed. Design sidewalks along parking lots at least 7 feet wide to allow for bumper overhang. Do not plant grass where car bumpers will overhang, use a mow strip.

**Fire Lanes** shall be designated with diagonal striping on the pavement. Do not paint curbs or install signs. Firelanes will be p[rovided per section 3.5 of NFPA 1, Fire Prevention Code.

**Bollards** used to define parking areas shall be constructed of metal and painted dark brown *Big Stone*. They may also be a cast smooth concrete with an integral color.

**Renovation** and improvement of parking areas should visually enhance the setting and improve the efficiency or capacity of the lot. Low maintenance landscaping is encouraged.

**Light Poles** See Lighting section.

**Lamp Types** See Lighting section.

**Curb and Gutter Location.** Specific locations of curb and guttered streets may be obtained form the Maintenance Engineering Flight within Civil Engineers.





## SIDEWALKS, TRAILS AND BIKEWAYS

### CROSS REFERENCE

Construction details maybe found in the California Department of Transportation highway design manual standard plans book.

### FUNCTION

Circulation systems for pedestrians and bicyclists provide an environmentally sound and healthy alternative to automobile travel. Increased pedestrian activity promotes the sense of neighborhood and community.

### INTENT

The guidelines are intended to promote attractive, safe, and easy to maintain pathways and bikeways.

### GUIDELINES

**Planning.** Develop a hierarchical network of pathways with each path relating to the volume of traffic, destination, and nature of experience in accordance with the BCP.

**Sidewalks** which provide direct access to facilities should align with the building and column grid lines. Pavers can be used as sidewalks or entryways, accents or to add esthetic value to open walking areas. See Roads section and landscaping for details.

**Sidewalk Widths.** Major roads through developed areas should have at least one 7-foot-wide walkway on one side of the road. Minor roads should have at least one walkway ( 3½-foot-wide) on one side of the road. Walks should be set back 5 feet from the curb. Along parking lots, walks should be at least 7 feet wide to allow for bumper overhang.

**Siting.** To minimize grades, site sidewalks and trails paralleled to contours whenever possible.

**Crosswalks.** Provide crosswalks where sidewalks intersect roads. The Base standard for defining crosswalks is 12-inch-wide striping, 6 feet apart, placed perpendicular to the curb. (Use paint rather than reflective material.)



*Pathway through dormitory area.*



*Sidewalk should align with building lines.*



*Typical crosswalk.*



*Concrete sidewalk required near buildings.*



*Bicycle path paved with asphalt.*



*Bicycle path painted along road.*

**Ramps.** Use curb cuts at all driveways, intersections, etc., and ramps leading into facilities to provide access for the disabled.

**Covered Walkways** may be developed at building entrances only.

**Control Joints and Expansion Joints** in concrete pathways shall be installed as required to prevent cracks.

**Sidewalk Materials.** Sidewalks near buildings are to be made of concrete.

**Path and Trail Materials.** Remotely located paths and fitness trails should be paved with asphalt or decomposed granite that is indigenous to the area, and is of an appropriate diameter for the function and maintenance of the system. Use timber edging to control erosion.

**Repair.** When it is necessary to patch a sidewalk, replace entire sections between control joints or expansion joints at same time.

**Buried Utilities.** When installing buried utilities, drill underneath sidewalks to avoid patching and setting.

**Special Applications.** Develop fitness trails and confidence courses to enhance existing recreational areas. Connect these paths when appropriate.

**Bikeway Standards.** Distinguish bicycle lanes incorporated into roads or paved pathways with painted striping or signs. Five-foot-wide, one-way lanes should be used in both directions. Two-way bicycle lanes should be a minimum of eight feet wide. Repaint striping every 6 months or as required.

**Bicycle Routes.** Establish bike routes along streets with low traffic volumes in accordance with the BCP.

**Bicycle Lanes** along roadways are encouraged as part of design. Desired locations can be verified with CEOEM. Bike lanes along primary roads should be edged with header curb. Refer to Roads section for additional guidelines.



## LANDSCAPES

### FUNCTION

Constructed landscapes can moderate solar exposure, block the wind, control noise, screen bad views or frame good ones, control erosion, and define the limits of an area.

### INTENT

Constructed landscapes include consideration of slopes and drainage, vegetation and irrigation systems to support them, surface treatment (imported rock or native earth), lighting, furniture, and site paving for pedestrians and vehicles.

The result of a successfully designed landscape creates pleasant pedestrian environments and managed spaces that transition from and are in harmony with the unique environment of this area.

The appearance of consistency and uniformity among individually landscaped sites is critical to insure Base-wide visual compatibility.

### GUIDELINES

**General.** Less can be better! Simple plans are easier to construct, easier to maintain, and may be far more attractive than complex plans.

**Maintenance.** No Plan is complete without consideration of exactly what the maintenance requirements are going to be. A Landscape Maintenance Plan shall be developed for each facility.

**Site Preparation.** Start with a clean site. Weeds, large stones, and other debris shall be cleared away.

**Slopes and Grading.** The ground shall be sloped away from buildings to ensure buildings remain dry during rain. Avoid the possibility of excessive erosion by directing roof drainage into primary drainageways or into planted areas where it can be absorbed by plants. Berms and swales shall be created for topographic diversity.



*Dormitory area -landscape plan.*



*Proposed Landscaping -at the credit union.*



*Airman's Walk between Dormitories 2433 and 22414.*



*Building 1 -landscape and elevated sidewalk.*



*Xeriscape landscaping at the Housing Office.*



*Japanese Black Pines -corner of Muroc and Popson.*

**Pedestrian Movement.** Sidewalks shall be comfortable, efficient, and interesting to navigate. They are pedestrian paths through and between destinations and may be part of a more complex pedestrian network, or provide emergency access to a facility entrance. Sidewalks shall be several inches higher than the adjacent landscape, in order to keep them clean and dry.

**Planter Containment.** Concrete 'mow curbs' shall be constructed to define edges and to more easily keep one material out of another. Wood or plastic bender-board and scalloped concrete edging shall be avoided. Sidewalks and 'mow curbs' shall be at least 2 inches higher than adjacent materials.

**Vegetation.** At the end of the Landscape section is a list of trees, shrubs, and ground covers that will grow well here. The landscape plan shall include something from each category so there will be a graduation of sizes, shapes, and colors. Group plants together as you would expect to see things growing in nature. Plants do eventually get larger so avoid planting too close to buildings or sidewalks. Use plantings to hide obtrusive site elements like dumpsters and backflow preventers.

**Grass** requires the greatest amount of water and maintenance, therefore lawns shall be placed only where people will enjoy them the most. Hybrid 'Marathon' Fescue grass is specifically conditioned to this climate zone and grows best here.

**Trees** shall be planted in simple groups of two or three, and shall be strategically placed to shade a window or a pedestrian walkway, to block the wind, or to hide an unsightly view. Each tree shall have two bubblers for adequate watering, and two strong poles to support the trees against the wind.

**Irrigation Systems.** An irrigation system shall be provided to sustain all planted landscapes, regardless of how drought-tolerant the plants may be. All exposed system components subject to freezing shall be insulated.





**Piping.** Schedule 40 PVC shall be used for all non-metal system components. Install swing-joints at all riser locations. Sub-surface piping shall be buried at least 8 inches below the finished grade.

**Bubblers and Spray Heads.** Bubbler heads shall be fully adjustable from 0- to 5-gallons-per-minute. Spray heads shall have a 6-inch pop-up riser and be fully adjustable for arc, radius, and flow.

**Irrigation Control Systems.** All irrigation systems shall be automatically controlled with a gearless, totally electronic control unit. Additionally, these units shall be keypad programmable, password protected, include an LED readout, and have a ni-cad battery backup. Controllers shall be located inside a mechanical room whenever possible.

**Rock/Barrier Layer.** Rock to be used as a finish ground cover shall consist of 1½- to 2-inch *Desert Tan* crushed rock, 2 to 4 inches thick. The earth base shall be thoroughly compacted prior to installation. Isolate the installation of imported rock from the compacted earth base with a weed mat or barrier layer. Use a porous fabric of nylon and vinyl held in place with landscape staples. No plastic or 'visqueen' material is acceptable. Washed Arizona River Rock of varying sizes can be used for feature locations and for drainage swales where a stable ground cover may be necessary.

**Boulders** incorporated in constructed landscapes shall match the *Desert Tan* rock. Boulders shall be installed as they occur in nature: protruding out of the ground and clustered together in groups.

**Site Furniture and Other Elements.** Color-integrated cast-concrete and/or medium-Bronze anodized metal shall be the finishes for site furniture and other elements. Designs shall have a modern appearance, will be damage resistant, and low to no maintenance.



*Tree Installation -bubblers and support poles.*



*Rock/Barrier Layer -used for stable ground cover.*



*Boulders in the Xeriscape landscape at the Housing Office.*





*Walkway -lighting bollards between Dormitories 2433 and 2414.*



*New Serpentine Planter Wall -at Building 1*



*New Hobby Shop Backflow Preventer -screened from view by landscape and enclosure.*



*New Hobby Shop -entrance.*



*Dormitory Area Landscape -concrete "mow curb."*





## LANDSCAPING STANDARDS

### Plant List

Common Name	1-Gal	5-Gal	10-Gal	15-Gal	24" Box
<b><u>DESERT TREES</u></b>					
Desert Willow			X	X	X
Arizona Cypress			X	X	X
Chilean Mesquite			X	X	X
Texas Mesquite			X	X	X
Chinese Pistache			X	X	X
Poplar			X	X	X
Cottonwood			X	X	X
<b><u>TEMPERATE TREES</u></b>					
Deodar Cedar			X	X	X
Leyland Cypress			X	X	X
Italian Cypress			X	X	X
Red Gum			X	X	X
Honey Locust			X	X	X
Japanese Black Pine			X	X	X
Holly Oak			X	X	X
Black Locust			X	X	X
<b><u>DESERT SHRUBS</u></b>					
Yellow Bird Of Paradise		X	X	X	
Mexican Bird Of Paradise		X	X	X	
Mediterranean Fan Palm		X	X	X	
Desert Spoon		X	X	X	
Compact Texas Ranger		X	X	X	
Green Cloud Texas Ranger		X	X	X	
Silver Cloud Texas Ranger		X	X	X	
New Zealand Flax		X	X	X	
Dwarf New Zealand Flax		X	X	X	
Sugar Bush		X	X	X	
Mexican Sage		X	X	X	
Joshua Tree		X	X	X	
Curveleaf Yucca		X	X	X	
Our Lord's Candle		X	X	X	
<b><u>TEMPERATE TREES</u></b>					
Bright Bead Contoneaster		X	X	X	
Bright Bead		X	X	X	
Evergreen Euonymus		X	X	X	
Pfitzer Juniper		X	X	X	
Buffalo Juniper		X	X	X	
Privet		X	X	X	
Roman Style		X	X	X	
Heavenly Bamboo		X	X	X	



## LANDSCAPING STANDARDS (CONCLUDED)

### Plant List

Common Name	1-Gal	5-Gal	10-Gal	15-Gal	24" Box
<b><u>TEMPERATE SHRUBS</u></b> (Continued)					
Dwarf Heavenly Bamboo		X	X	X	
Photina		X	X	X	
Chinese Photina		X	X	X	
Tobira		X	X	X	
Dwarf Tobira		X	X	X	
India Hawthorne		X	X	X	
Arborvitae		X	X	X	
<b><u>DESERT GROUND COVERS</u></b>					
Coyote Bush "Twin Peaks"	X	X			
Snow in Summer	X	X			





## SITE FURNISHINGS

### FUNCTION

A coordinated balance of site furnishings which complement the adjacent facilities' architectural style, is required to produce a quality place to live and to work.

### INTENT

These guidelines provide direction and coordination for the integration of site furnishings into the Base architectural style.

### GUIDELINES

**Shade Structures.** Shade structures in the Main Base public areas shall conform to the Base standard design available at the Base Civil Engineering Design and Construction Flight Office 95 CEG/CECC-B. Shade structures for the non-public areas of the Base may deviate from the Base standard design with approval of the Base Civil Engineer Office.

**Mailboxes** for the dorm areas shall conform to the Base standard design available at 95 CEG/CECC-B. *Housing area mailboxes shall be the gang type where feasible.*

**Monuments, Displays, and Flag Poles.** All permanent displays including memorials, commemorative plaques, flag poles and other displays shall require approval from the Base Civil Engineer Office for location and siting prior to installation. These will be reviewed on a case-by-case basis.

**Playgrounds, Sandboxes, and Picnic Areas.** Sandboxes within playgrounds and picnic areas shall be contained with a concrete curb. Padding of Synthetic Impact Attenuating Surface Material shall be installed as specified in the Army Corps of Engineers Guide, Specification No. 02535. Padding shall not be installed adjacent to sand due to resultant slippery surfaces.

**Bus Stop Covers** shall conform to the Base standard design available at 95 CEG/CECC-B.



*Shade structure shall conform to standard design.*



*Sand boxes must be contained with concrete curbs.*



*Aircraft display monument requires siting approval.*



*Concrete table and seats.*



*Split-faced block fence.*



*Trash receptacle screening wall.*

**Tables and Seating** located in the public areas of the Main Base shall be cast smooth concrete and have an integral tan color compatible with the Base paint scheme. Tables and seating located in the non-public areas of the Main Base may be metal with Bronze anodized aluminum or painted *Big Stone* finish. *Tables and seating located in the housing public areas shall be cast smooth concrete and have an integral tan color compatible with the Base paint scheme.*

**Planters** shall be cast smooth concrete with integral tan color.

**Walls and Fences.** The standard for concrete masonry unit block walls and fences on Edwards AFB shall consist of standard split-face blocks with integral color No. 200, medium weight by Angelus Block Company, Orange, California (or equal). Grout shall be the same color as the split-face block. Maximum height shall be 6 feet. Security fences must meet the Security Police requirements for the particular area. No slats of any kind will be allowed in chain link fences. Green mesh fabric is the acceptable screening method.

**Trash Receptacle Screening** shall be constructed of split-face concrete masonry blocks with an integral color No. 200, medium weight by Angelus Block Company, Orange, California (or equal). Solid gates shall be installed where complete screening is required.

**Trash Receptacles** shall be one type provided by the Base refuse contractor and shall be painted dark brown *Big Stone*.

**Recycling Bins** are not required outside buildings in the Base areas since recycling is accomplished at the Base landfill. A place shall be provided for recycling bins in the building. The bins shall be located away from the normal traffic flow area and shall be screened from normal view. Bin storage shall be designed for easy access.

**Bollards** may be constructed of metal painted dark brown *Big Stone*. They may also be a cast smooth concrete with integral tan color.





**Newspaper Vending Machines** shall be painted dark brown *Big Stone*.

**Bike Racks** shall be constructed of metal with Bronze anodized or painted dark brown *Big Stone* finish.

**Phone Booths** shall be painted dark brown *Big Stone*.

**Exterior Equipment Screening** shall be constructed around all surface grade pad mounted equipment such as but not limited to air condition equipment, electrical transformers, communication dish antennas, etc. The screen shall be constructed of concrete masonry unit block of standard split-face block with integral color No. 200, medium weight by Angelus Block Company, Orange, California (or equal). Grout shall be the same color as the split face block.

**Cigarette Butt Cans.** Butt can replacements shall be combination butt and trash can type and shall be color integrated cast concrete with textured finish and shall be located adjacent to the entrance of the facility.



*Family Housing Office -combination butt and trash receptacle.*



*Vending machines shall be painted dark brown.*



*Phone booths shall be painted dark brown.*



*Typical street light pole.*



*Typical parking area light pole.*



*Pedestrian light pole.*

## LIGHTING

### FUNCTION

Providing safe and useable areas for Base functions during non-daylight hours requires positioning well-planned lighting systems at appropriate locations.

### INTENT

Well-planned lighting systems which conform to the Base lighting system standards shall be provided. Energy efficient fixtures, lamps and systems in general shall be used.

### GUIDELINES

**Illumination Levels** shall be adequate to provide the functional illumination for activities during non-daylight hours and shall conform to the latest requirements of the National Electric Code (NEC).

**Lamp Types** shall be high pressure sodium, 480 volt with photo cell control, rated at 250 or 400 watts as required for streets and parking lots. Other types such as fluorescent, mercury vapor, metal halide, and incandescent, may be appropriate lamp type for particular functions.

**Location and Spacing** of lighting systems shall provide adequate lighting level for the function area while preventing glare and illumination of surrounding areas.

**Street Lights.** Poles shall be 30 feet long, galvanized steel, rated for 100 mile per hour wind with a 1.3 gust factor. The lighting fixture for the street lighting system shall be cobra-head style with gray factory-coated aluminum housing.





**Parking Lot Lights.** Poles shall be 25 feet long, square aluminum housing and dark duranodic Bronze finish, rated for 100 mile per hour wind with a 1.3 gust factor. Lighting fixtures for parking lots shall be shoe box style with aluminum housing and dark duranodic Bronze finish.

**Pedestrian Lights.** Poles shall be of one type throughout the mission area to match those of the dormitory area. Lighted bollards shall be used in pedestrian areas that are lacking adequate lighting from other sources.

**Sports Lighting** shall be adequate for the function and orientated to prevent glare in the surrounding areas.

**Aviation Lighting** shall conform to the latest airfield lighting requirements.

**Accent Lighting** should be used when it is desirable to highlight architecture, landscaping or site furnishings.

**Lighting Exception.** If parking lot and street lighting fixture are mounted on the same pole (one fixture providing light for the street and another for an adjacent parking lot), the pole and all fixtures on that specific pole will be the "street light" type.



*Typical lighting fixture for street lights.*



*Typical lighting fixture for street lights.*



*Lighted bollards provide additional visibility.*



*Gym -typical athletic room.*



*Mezzanine systems.*



*Typical lighting fixture for street lights.*

## SPECIAL CONSTRUCTION

### FUNCTION

Special construction items should blend in with the surrounding Base facility architecture and should promote balance and harmony.

### INTENT

These guidelines are provided to create an awareness of the Base standards when designing specialty items.

### GUIDELINES

**General.** When specialty items such as those noted below are being considered for design, the designer shall review the Base design standards and apply the appropriate standards to the design.

#### Clean Rooms

#### Communication Towers

#### Athletic Rooms

#### Sound Condition Rooms

#### Computer Rooms

#### Bullet Resistant Protection

#### Pre-Engineered Structures

#### Mezzanine Systems

#### Swimming Pools

**Security/Fire Management Systems.** See Interiors, subparagraph Fire Protection Systems.

**Automated Fire Suppression Systems.** See Interiors, subparagraph Fire Protection Systems.





**Security Management Systems.** New Intrusion Detection Systems (IDS) shall be reviewed by Civil Engineers alarm shop and approved by Security Police resource protection.

New IDS's shall meet class B standards.

Changes to existing systems shall be approved jointly by Civil Engineers and Security Police.

Alarm control panels, sensors, wiring, powersupply, communications link and other materials or work involved with intrusion detection systems shall be as required by security police and civil engineers.

### **Safety Showers**

**Recycling Bins** are not required outside buildings in the Base areas because recycling is accomplished at the Base landfill.

**Systems** designed for Edwards shall be compatible with existing systems or factory training for new proposed system will be provided by the contractor and the cost be included in the base bid for the system.

**Clearance** around any equipment must be provided as recommended by the equipment manufacturer.

**Fire protection construction.** Installation of cable for communications or electrical power shall be made per requirements of Milhdbk 100813 and NFPA 75. Any penetrations of walls, floors or ceilings shall be sealed with a material having a fire resistance rating equal to that of the wall, ceiling or floor. Seal the open ends of electrical conduits with a material having a fire resistance rating of at least one hour.

**Fall protection** is found under Roofs and again under Ladders in the exteriors section. However, any roof over thirty feet high requires typical fall protection no matter the pitch.

**Environmental permits** for equipment, motors, etc. shall be made a responsibility of the construction contractor to obtain during construction.



*Pre-engineered structure.*



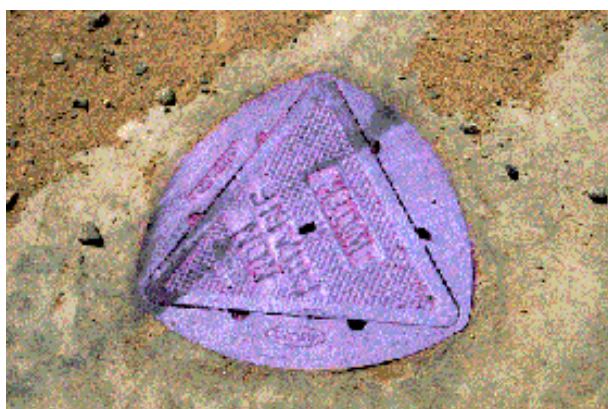
*Swimming Pool.*



*Safety shower.*



*Utility equipment screen.*



*Reclaimed water system marker.*



*Sealed manhole covers.*

## UTILITIES

### FUNCTION

Standardized utility systems reflect increased reliability and safety leading to greater health and comfort for the Base occupants. Maintenance and repair of the Base utility systems is faster and more economical when the utility systems are designed to meet Base standards.

### INTENT

To provide Base standards for design of utility systems and promote awareness of the existence of these standards. To ensure orderly utility development and quality installation leading to long service life and to ensure that products such as fire hydrants, piping, valve fittings, meters, etc., be of one type throughout the Base.

### GUIDELINES

**Location, Placement, and Screening.** Below ground utilities including water, sewer, cable television, electric power, telephone, and gas, shall be located in readily accessible areas for cleaning and repair. These utilities shall not be placed at under paved roads or in heavy traffic areas where it can be avoided per ETL 88-4. The location of utility system equipment and components shall be placed in areas where the visual impact is less significant and the item is screened from view. Provide architecturally compatible screens around the items when necessary to block from normal viewing.

**Right of Way.** Select siting with the least interference to other utilities. Coordinate right of way with 95 CEG/CECV, Community Planning.

**System Standards.** The marking of utility elements shall be coordinated with the Civil Engineering Design and Construction Flight Office to minimize visual impact upon the surrounding Base environment. All non-metallic buried utility systems shall have a metallic tape installed in the utility trench to aid in locating the underground piping. Reclaimed water piping shall be located with purple colored markers.





**Utility Markers** on Base shall be as inconspicuous as possible and blend into the surrounding environment. Small, low profile markers shall be used on Base. Do not paint pavement to mark underground utilities.

### Sewer System

**Sewer pipe lines** shall be constructed using either vitrified clay pipe (VCP) or polyvinyl chloride (PVC). No concrete sewer lines will be allowed.

**Covers** on all main sewer lines shall have a minimum cover of 48 inches. All laterals shall have a minimum cover of 24 inches.

**Trenching** shall be compacted at the bottom of the trench to 95 percent of maximum density and to a depth of 12 inches per American Society of Testing Materials (ASTM) standards. All trench fill soil shall be compacted to a minimum of 90 percent of maximum density in 6-inch lifts. No slurry filling of trenches will be allowed.

**Manholes** shall be made of reinforced concrete and shall conform to industry standards. All manhole covers shall be properly sealed to prevent the escape of sewer gases.

#### **Industrial Wastewater Permit Application.**

Industrial wastewater system construction shall be in accordance with AFFTC Instruction 32-6, Edwards AFB Wastewater Instruction. An AFFTC Form 5852, Permit for Industrial Wastewater Discharge, shall be obtained prior to connecting to the sanitary and storm sewer systems.

### Water System

**Looping.** Avoid dead end piping networks to prevent stagnation and increase the overall performance and reliability of the distribution system.



*Utility markers should blend into surrounding areas.*



*Water valve location marker.*



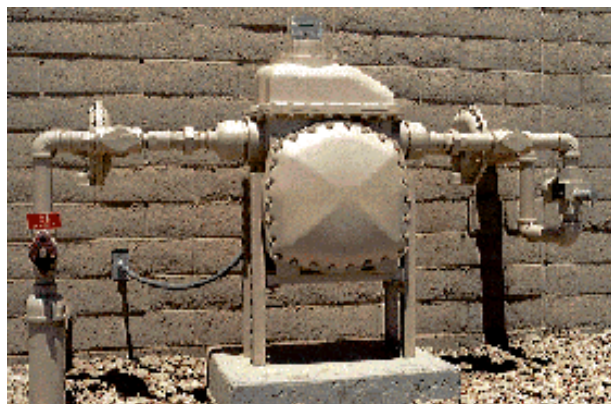
*Backflow preventers.*

Table 1  
Water Pipe Material

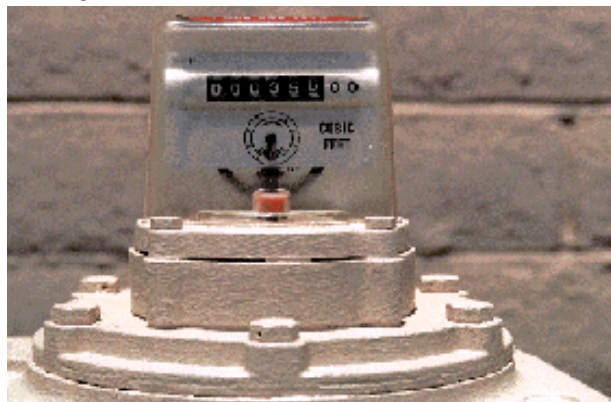
Application	Size Range (inch)	Material
Water Mains	6 to 20	PVC Class 900 and 905
Services	1/4 to 2	Copper and PVC
Above Ground (for BFPs, etc.)	2 to 8	Steel and Cast Iron



Gas Valve.



Gas regulator.



Gas meter.

**Fire Flow Testing and Verification of the Adequacy of the Distribution System (Hydraulic Analysis).** The overall adequacy of the water systems including its ability for fighting fires should be evaluated during the early stages of design which add more than 200 gpm peak demand to the distribution system. Perform fire flow testing and, when deemed necessary by 95 CEG/CECC, perform a hydraulic analysis to determine the impact of the new demand upon the existing network under simulated conditions.

**Backflow Preventers** shall be installed in mechanical rooms when possible. They shall be wrapped with insulation and taped and painted as specified in the Exterior Section, subparagraph Painted Exterior Surfaces for Main Base Areas. On exterior BFPs enclosures or screens shall be installed. Where that is not feasible, evergreen vegetation shall be planted to screen the BFPs from view.

**Water Meters** shall be provided at all new or renovated buildings.

**Air Release Valves** shall be installed away from heavy traffic areas and in locations which allow easy access and routine maintenance.

**Isolation Valves** shall be provided on all mains, at tee intersections, and along extremely long transmission lines to permit repairs without disrupting an entire grid. These may be located below paved surfaces, preferably out of traffic areas. Isolation Valves shall be American Water Works Association (AWWA) approved isolation gate valves. Valve shall be epoxy coated and lined, and shall have resilient seals and coated discs. Each buried valve shall be installed in a sand bedding and also provide a cathodic protection magnesium anode on each buried valve assembly.



## Gas System

**Gas Valves** shall be marked for location. Markers shall be painted a dark brown color *Big Stone*.

**Gas Regulators** shall be located away from visible sites such as the front of buildings or houses. The regulator shall be screened from view with landscaping or fabricated gas regulator enclosures specifically made for the application. (See Southern California Gas Company standard details for small house service regulators.)

**Pipe Material.** Typical underground gas mains and service piping material shall be polyethylene (PE) and shall meet the American Gas Association (AGA) Plastic Pipe Manual for Gas Service 1985 standards.

**Pressure.** Ordinary gas pressure on mains is approximately 20 psi. Maximum design operating pressures is 50 psi. Use 100 psi design pressure for regulators, valves, etc., when possible.

**Cathodic Protection.** All metallic gas piping, excluding anodeless risers, shall be cathodically protected.

**Gas Meters** shall be provided at all new or renovated buildings.

**Storm Drainage.** All curbs and gutters shall be connected to the storm drainage system.

**Fuel Tanks** shall be installed above ground and conform to the requirements of Kern County Regulation UT 30 and California Tank Regulation in Title 23, Division 3, Chapter 16. Underground tanks are generally not allowed on Base. Use of above ground fuel lines is encouraged. Below ground fuel lines shall be double wall pipe with stainless steel interior piping and a compatible exterior pipe. Fiberglass is not allowed for the interior piping.

**Oil and Water Separators** shall meet the most stringent installation requirements of Kern County or the Air Force Flight Test Center Environmental Management environmental regulations.



*Water meter.*



*Storm drainage system.*



*Above ground fuel tanks.*



*Barriers painted brown.*

**Painting.** See Exteriors, subparagraph Painted Exterior Surfaces for Main Base Areas.

**Communications** systems work shall be coordinated with the Base communication organization.

**Repairs, Installation, and Maintenance** of utilities shall be accomplished with materials in compliance with the Base design standards. Any disturbance to the surrounding landscape during utility work shall be corrected and the landscape returned to its original condition.





## AIRCRAFT RUNWAYS, TAXIWAYS AND RAMPS

### FUNCTION

All work accomplished on an active airfield area such as Edwards AFB must be coordinated with the Airfield Management/Base Operations Office, and must be designed and constructed to meet current airfield standards.

### INTENT

These guidelines provide information on the airfield standards to be met and on the approval required to accomplish airfield work.

### GUIDELINES

**General.** All airfield runway, taxiway, and ramp design work shall be accomplished by a licensed architecture-engineering firm experienced in airfield construction and maintenance. All airfield construction, repair, and maintenance shall be performed in accordance with published Army Corps of Engineers guide specifications and regulations. All airfield runway, taxiway, and ramp work must be approved by the Base Civil Engineer Office, the Army Corps of Engineers Sacramento Office (POC Mr. Ron Fong, telephone number 916 557-7327) and the Edwards AFB Airfield Consulting Group, Archer Technology Group, Kansas City, MO (POC Dr. David Crell, Telephone number 913 362-9753).



*Airfield work.*



*Airfield work.*



*Airfield work.*







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## QUESTIONS AND POCS

Edwards AFB Comprehensive Plan .....	95 CEG/CECV, Comprehensive Planning Flight Office
Architectural Styles .....	95 CEG/CEC, Engineering Division Office
Environmental .....	AFFTC/EM, Environmental Management Office
Fire Protection .....	95 CEG/CEFT, Fire Department Office
Furniture, Bulletin Boards .....	95 CEG/CECC, Design/Construction Flight Office
Interiors .....	95 CEG/CECC, Design/Construction Flight Office
Landscaping .....	95 CEG/CECC, Design/Construction Flight Office
Lighting .....	95 CEG/CECC, Design/Construction Flight Office
Parking .....	95 CEG/CECC, Design/Construction Flight Office
Roads .....	95 CEG/CECC, Design/Construction Flight Office
Sidewalks, Trails and Bikeways .....	95 CEG/CECC, Design/Construction Flight Office
Signing .....	95 CEG/CECC, Design/Construction Flight Office
Site Furnishings .....	95 CEG/CECC, Design/Construction Flight Office
Utilities .....	95 CEG/CECC, Design/Construction Flight Office
Aircraft Runways, Taxiways, and Ramps .....	95 CEG/CECC, Design/Construction Flight Office
Special Construction .....	95 CEG/CEC, Engineering Division Office
Energy Efficiency .....	95 CES/CEOE Maintenance Engineering Office
Communications .....	95 CS/SCX
Safety .....	AFFTC/SEG



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## OTHER EDWARDS AFB PLANS AND GUIDELINES

CADD .....	CADD Standards, 95 CEG/Maintenance Engineering
Mechanical .....	Mechanical Design Standards, 95 CEG/CECC, Design/Construction
Roofing .....	Roof System Guidelines, 95 CEG/CECC, Design/Construction
Curb and Gutters .....	Curb and Gutter Plan, 95 CEG/Maintenance Engineering Office
Comprehensive Plan .....	EAFB Comprehensive Plan, 95 CEG/CECV
Environmental Protection .....	Environmental Protection Specification Section 01430 (See Attachment 1) AFFTC/EM
Procurement Package RequirementsI .....	95 CEG/CECC, Design/Construction (See Attachment 2)





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### **DESIGN STANDARDS UPDATING POLICY**

All users of the Design Standards should send their comments for additions or corrections to 95 CEG/CEC, Engineering Division Office. A bi-annual additions/corrections sheet will be provided to holders of the Design Standards for attaching to the document pending revision of the complete document.



## **SECTION 01430**

### **ENVIRONMENTAL PROTECTION**

NOTE: Latest version available on disk

#### **PART 1. GENERAL**

##### **1.1 DEFINITIONS**

For the purpose of this specification environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and recreational purposes. The control of environment pollution requires consideration of air, water, and land, and involves noise, solid waste management and management of radiant energy and radioactive materials, as well as other pollutants.

##### **1.2 APPLICABLE PUBLICATIONS**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the test by the basic designation only.

U.S. Army, Corps of Engineers Publication:

EM 385-1-1                      Safety and Health Requirements Manual  
(1 April 1981, Rev. Oct 1992)

##### **1.3 ENVIRONMENTAL PROTECTION REQUIREMENTS**

Contractor shall provide and maintain, during the life of the contract, environmental protection. Plan for and provide environmental protective measures to control pollution that develops during normal construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Plan for and provide restorative measures for those areas disturbed by construction and project related activities. Comply with Federal, State, and local regulations pertaining to the environment, including but not limited to solid and hazardous waste generation, natural and cultural resources, water, air and noise pollution.

###### **1.3.1 Environmental Protection Plan**

Within 15 days after receipt of Notice of Award of the contract and at least 7 days prior to the Preconstruction Conference, the Contractor shall submit in writing an Environmental Protection Plan and meet with representatives of the Contracting Officer to develop mutual understanding relative to compliance with this provision and administration of the environmental protection program. Approval of the Contractor's plan will not relieve the Contractor of his responsibility for adequate and continuing control of pollutants and other environmental protection measures. The Government reserves the right to make changes in this Environmental

Protection Plan and operations as necessary to maintain satisfactory environmental protection performance. The Environmental Protection Plan shall be based upon the terms and conditions published in the environmental document prepared for the project, and shall include but not be limited to the following:

#### 1.3.1.1 Laws, Regulations, and Permits

The Contractor shall prepare a list of Federal, State, and local laws, regulations and permits concerning environmental protection, pollution control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations and permits.

#### 1.3.1.2 Protection of Features

The Contractor shall determine methods for the protection of features to be preserved within authorized work areas. The Contractor shall prepare a listing of methods to protect resources needing protection, i.e., trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, archaeological and cultural resources.

#### 1.3.1.3 Procedures

The Contractor shall implement procedures to provide the required environmental protection and to comply with the applicable laws and regulations. The Contractor shall set out the procedures to be followed to correct pollution of the environment due to accident, natural causes or failure to follow the procedures set out in accordance with the Environmental Protection Plan.

#### 1.3.1.4 Permit or License

The Contractor shall obtain all needed permits or licenses. The contractor shall coordinate all environmental permits with the Base Environmental Management Office.

#### 1.3.1.5 Drawings

The Contractor shall include drawings showing locations of any proposed temporary excavations or embankments, haul roads, drainage, stream crossings, material storage areas, structures, parking areas, equipment storage areas, sanitary facilities, stockpiles of earth materials, and disposal areas for excess earth material and unsatisfactory earth materials, and any other project related temporary disturbance. The location of all such areas will be coordinated in advance with 95 CEG/CECV (Base Planning) and the Air Force Flight Text Center Environmental Management (AFFTC/EM) office. In no case shall any location be proposed for use that is not analyzed in the environmental document.

#### 1.3.1.6 Environmental Monitoring Plans

The Contractor shall include environmental monitoring plans for the job site which incorporate land, water, air noise, and any other required or necessary monitoring.

#### 1.2.1.7 Traffic Control Plan

The Contractor shall include a traffic control plan for the job site, which shall include any mitigation identified in the Environmental Document (if applicable).

#### 1.3.1.8 Surface and Groundwater

The Contractor shall establish methods of protecting surface and groundwater during construction activities.

#### 1.3.1.9 Work Area Plan

The Contractor shall include a work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. The plan shall include measures for marking the limits of use areas. The proposed work areas shall not exceed those limitations or boundaries identified in the Environmental Document prepared for this project.

#### 1.3.1.10 Plan of Borrow Area(s)

The Contractor shall include a plan of borrow area(s) for the job site. Currently, no borrow pit exists on Base for contractor use. Proposals for borrow pit may be submitted to the Base Civil Engineer and Environmental Management Office for consideration.

### 1.4 SUBCONTRACTORS

Assurance of compliance with this section and all related environmental documents and procedures by subcontractors will be the responsibility of the Contractor.

### 1.5 PERMITS OBTAINED BY CORPS OF ENGINEERS

The Corps of Engineers will not obtain any permits for this project. See Contract Clause entitled "PERMITS AND RESPONSIBILITIES".

### 1.6 REGULATORY REQUIREMENTS

The Contractor shall comply with all Federal, State and local regulatory and statutory requirements.

## PART 2 PRODUCTS (not applicable)

## PART 3 EXECUTION

### 3.1 PROTECTION OF ENVIRONMENTAL RESOURCES

The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract shall be protected during the entire period of this contract. The Contractor shall confine his activities to areas defined by the contract drawings, specifications, and environmental documents. When conflict exists, the Environmental Document shall govern. Environmental protection shall be as stated in the following paragraphs.

#### 3.1.1 Protection of Land Resources

Prior to the beginning of any construction, the Contracting Officer will identify all land resources to be preserved within the Contractor's work area (see the Environmental Document for this identification). The Contractor shall not remove, cut, deface, injure or destroy any environmental features including plants, insects, land features of animals outside the boundaries established in the Environmental Document prepared for this project. The Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without special permission from the Contracting Officer. No ropes, cables, or guys shall be fastened or attached to any trees for anchorage unless specifically authorized. Where such special emergency use is permitted, the Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs.



#### 3.1.1.1 Work Area Limits

Prior to any construction, the Contractor shall mark the areas where no work is to be performed under this contract. Isolated areas within the general work area which are to be saved and protected shall also be marked or fenced. Monuments and markers shall be protected before construction operations commence and during all construction operations. Where construction operations are to be conducted during darkness, the markers shall be visible during darkness. The Contractor shall convey to his personnel the purpose of marking and/or protection of all necessary objects.

#### 3.1.1.2 Protection of Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features to be preserved, indicated and defined on the drawings submitted by the Contractor as a part of the Environmental Protection Plan, shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques

#### 3.1.1.3 Reduction of Exposure of Unprotected Erosible Soils

Earth work brought to final grade shall be finished as indicated and specified. Side slopes and back slopes shall be protected from wind and water erosion using commonly accepted construction practices as soon as practicable upon completion of rough grading. All earth work shall be planned and conducted to minimize the duration of exposure of unprotected soils. Except in instances where the constructed feature obscures borrow areas, quarries and waste material areas, these areas shall not initially be cleared in total. Clearing of such areas shall progress in reasonably sized increments as needed to use the areas developed as approved by the Contracting Officer. Terms and conditions identified in the environmental document to minimize production of airborne particle shall be incorporated into the project.

#### 3.1.1.4 Temporary Protection of Disturbed Areas

Such methods as necessary shall be utilized to effectively prevent erosion, control sedimentation, and entrainment of dust and other particulates in the wind.

#### 3.1.1.5 Location of Contractor Facilities

The Contractor's field offices, staging areas, stockpiles, storage, and temporary buildings shall be planned in areas designated on the contract drawings and approved by the Contracting Officer, and coordinated with the Base Civil Engineer and Environmental Management Office. Temporary movement or relocation of Contractor facilities shall be made only on approval by the Contracting Officer.

#### 3.1.1.6 Borrow Areas on Government Property

Currently there are no borrow areas located on Edwards Air Force Base (AFB). Edwards AFB is receptive to proposals for borrow areas. Proposals must be coordinated with the Base Civil Engineer and the Environmental Management Office in advance of any borrow area usage.

#### 3.1.1.7 Disposal Areas on Government Property

There are no disposal sites located on Edwards AFB. Contractor shall haul material to an off-base approved disposal site.

#### 3.1.1.8 Temporary Excavation and Embankments

Temporary excavation and embankments shall be controlled to protect adjacent areas from disturbance.

#### 3.1.1.9 Disposal of Solid Wastes

Solid wastes (excluding clearing debris) shall be placed in containers which are emptied on a regular schedule. All handling and disposal shall be conducted to prevent contamination. All disposal of solid wastes shall be at a Contracting Officer approved, off-base facility. The Contractor shall provide the Contracting Officer with copies of records showing the actual weight of solid waste disposed, as measured at the disposal facility, as well as disposal facility identification.

The Contractor shall be responsible for the preparation of all manifest(s) and or other documentation, for all solid waste. For signature required by law prior to disposal, the Contracting Officer's representative (Edwards AFB Environmental Management Office) shall sign the manifests. The Contractor shall obtain the services of a licensed and approved transporter of hazardous and or non-hazardous material(s). The Contractor shall return copies of the completed manifests to the Environmental Management Office department within 30 days of the date of the manifest(s). All costs involved in the preparation of the hazardous or non-hazardous manifest(s) and or other documentation, removal, disposal, recycling and or other costs involved, etc., shall be for the responsibility of the Contractor.

Disposal of chemical (hazardous) wastes. The off-base disposal of all hazardous materials must be in accordance with all applicable laws, rules and regulations, and the Base Hazardous Materials and Hazardous Waste Disposal plan.

Paint, paint products, sealant, solvents, cements, caulking, asphaltic compounds, pesticides, herbicides, and rodenticides, etc., are all considered to be hazardous materials. The containers in which these materials are held, unless the container is thoroughly dried, are also considered to be hazardous waste. All usable or unusable residues shall be retained by the Contractor. Thoroughly dried containers that have held hazardous materials shall be prepared for disposal at an off-site location by punching a ¼-inch (.6 centimeters) hole in the container 2 inches (5 centimeters) up from the bottom.

Chemical wastes (including pesticides) shall be stored in appropriate containers in compliance with all applicable laws, rules, and regulations. The waste shall be removed from the work area to a Contracting Officer's approved, off-base location, and disposed of in accordance with Federal, State, and local regulations. No waste shall remain on Edwards AFB for longer than 75 days. Contractor shall maintain appropriate records and manifests of disposed quantities and locations in the event of a Federal, State or Local inspection of records. The Contractor shall be responsible for the preparation of all manifest(s) and or other documentation. The Contractor shall obtain the services of a licensed and approved transporter of hazardous and or non-hazardous material(s) and or other documentation, to be returned to Edwards' Environmental Management Office within 30 days of the date of the manifest(s). All costs involved in the preparation of the hazardous or non-hazardous manifest(s) and or other documentation, removal, disposal, recycling of wastes and or other costs involved, etc., shall be the responsibility of the Contractor.

#### 3.1.1.10 Hazardous Materials

The Contractor shall submit Material Safety Data Sheets (MSDS) on all hazardous materials (As defined by Federal, State, and local regulations) before such materials are brought on Base. The Contractor shall maintain a Hazards Communication Program until the project is completed. All project personnel shall be informed of the program, and the location of the program materials.

#### 3.1.1.11 Contractor Equipment

The parking and servicing of contractor equipment and vehicle is of concern to Base Environmental Management. Both mobile (trucks, bulldozers, and etc.,) and immobile (generators, welding machines, compressors) equipment is covered by this section. The hazards of concern included those associated with the leaking or spilling of fuels, oils, greases, cleaning agents, and etc. The Contractor shall implement the following mitigation:

- a. Impervious membranes be used to cover the ground surface where mobile and immobile equipment would be parked and/or serviced.
- b. That all leaks be repaired immediately or equipment be replaced as necessary, and that the equipment be kept in generally good repair.
- c. All used oils, filters, etc., be removed from the site on a daily basis, and all leaks and spill be cleaned up immediately. Contractor is responsible for complying with all applicable laws regarding release to the environment of any chemicals.
- d. All fuels, oils, lubricants and etc., stored on site be stored, dispensed and etc., stored on site be stored, dispensed, used, and disposed of in accordance with all applicable Federal, State, and local laws, rules and regulations.

It is suggested that the Contractor provide an equipment servicing truck or a Contracting Officer approved subcontractor for refueling, oiling, lubricating and etc. This would eliminate the need to store fuels, oils and lubricants on Base, and the associated environmental liability.

General Electrical Note. All new electrical equipment, of all types, purchased for Edwards AFB projects contain no detectable PCBs.

#### 3.1.2 Pollution Prevention

The Contractor shall adhere to Federal, State, local and Base policies with regards to pollution prevention. The use of Class 1 ozone depleting substances (ODCs) during the performance of this work or when used in equipment, is discouraged. Any usage of Class 1 ODC must be coordinated with the Contracting Officer, the Base Environmental Management Office and the Hazardous Materials Pharmacy before work is started. The Contractor shall minimize the usage of hazardous materials and subsequent generation of hazardous wastes whenever possible. Contractor shall maintain an inventory of hazardous materials brought on Base, and shall provide a copy of this inventory to the Contracting Officer. The Contractor shall employ source reduction techniques whenever possible to minimize wastes. The Contractor shall maximize the usage of materials containing recycled contents in accordance with affirmative procurement policies. The Contractor is encouraged to use recycling whenever possible. The Contractor is encouraged to demonstrate conservation of energy and natural resources.

Should "PCB" ballast(s) be encountered on this project, and, in order to protect Edward's AFB, known as the generator, from liability, now or in the future the contractor shall:

- a. Recycle PCB contaminated ballast(s), should they be encountered on this project.
- b. Not dispose of any part of the ballast(s) containing "PCBs" in any Federal, State, or local approved landfill.

There are currently no known facilities authorized to accept "PCB" contaminated ballast(s) for "recycling" within the state of California. All ballast's capacitors and other "PCB" contaminated material shall be disassembled at a State or Federally approved facility. Incineration of all "PCB" contaminated material shall be in accordance with State and or Federal environmental requirements, 99.9999 percent destruction, and shall be



so noted on the manifest or other documentation that is returned to the Edwards AFB AFFTC/EM department. Notation of the recycling of all other parts of the non-contaminated remaining metal portions of the ballast(s) recycled in a State or Federal environmentally approved facility, and, the manner of the recycling shall be noted on the manifest or other documentation that is returned to Edwards AFB AFFTC/EM department. Should non-contaminated ballast(s) be encountered on this project, the Contractor shall recycle the ballast(s) in accordance with all local, State, Federal and Air Force approved methods in an approved facility and in accordance with all approved environmental regulations.

Should fluorescent tubes or HID lamps be encountered on this project, it is recommended that the contractor not dispose of fluorescent tubes or Hid lamps that have been identified as containing mercury, in any Federal, State, or Local landfill. Recycling of fluorescent tubes and HID lamps that have been identified as containing mercury, in order to reclaim the mercury, Glass and other metal parts, shall be accomplished by a State or Federal approved recycler, in accordance with State and or Federal environmentally approved methods. There are State and or Federal approved facilities for the recycling of fluorescent tubes and hid lamps containing mercury located in the state of California. Notification of the State or Federal approved recycler shall be noted on the manifest, or other documentation, which is to be returned to Edwards AFB AFFTC/EM department..

### 3.2 HISTORICAL, ARCHAEOLOGICAL AND CULTURAL RESOURCES

3.2.1 There may be cultural resources in or near the work area. All work of a ground disturbing nature will be confined to those areas designated for the project. Environmental documentation shall be carefully reviewed for any special directions or restrictions related to cultural resource protection, and all mitigation identified in the environmental document shall be incorporated into the project.

Known cultural resources within or adjacent to the contractor's work area will be so designated by the Contracting Officer. Precautions shall be taken by the Contractor to avoid and preserve all such resources as they existed at the time they were pointed out to the Contractor. The Contractor shall depict the location of these resources of the contract drawings and shall assume responsibility for their protection during the contract. Cultural resource location information is protected and shall be disseminated only on a need-to-know basis.

All contract personal shall be instructed not to collect any artifact or specimen or trespass into areas designated as cultural resources.

If during construction items of an apparent archaeological or historic interest (i.e., arrowheads, old bottles, etc.) are discovered, they shall be left undisturbed and the Contractor shall report the find immediately to the Contracting Officer. The Contracting Officer shall then immediately notify the Base Historic Preservation Officer of the find so that the find may be evaluated.

### 3.3 PROTECTION OF FISH AND WILDLIFE RESOURCES

The Contractor shall keep construction activities under surveillance, management and control, to minimize interference with disturbance to and damage of fish and wildlife. Species that require specific attention along with measures for their protection shall be listed by the Contractor prior to beginning of construction operations.

#### 3.3.1 Wildlife Encounters During Construction

It is not anticipated that there will be an abundance of wildlife encounters at the project site. However, should the Contractor discover animals living within the construction boundaries, operation shall be suspended at the site of discovery and continued in other areas. The Contractor shall notify the Contracting Officer immediately of the finding. Included with the notification shall be a brief statement to the Contracting Officer of the location and the findings. How to identify sensitive animals that may be discovered will be provided at the Preconstruction Conference.

#### 3.3.2 Desert Tortoise

Contractors shall follow all terms and conditions identified in the Biological Opinion for Routine Operations and Facility Construction with the Cantonment Areas of Main and South Base, Edwards Air Force Base, CA (1-6-91-F-28), dated 4 Dec 91, or the applicable biological opinion for this project. The applicable biological opinion will be included in the environmental document.

The Contractor shall follow all terms and mitigation identified in the Biological Opinion that is applicable to this project. The Contractor employees shall not touch, harm, harass, or kill desert tortoises. The Contracting Officer shall be notified immediately of all desert tortoise sightings. Should construction activities threaten the survival of any desert tortoises, those activities will immediately cease.

#### 3.3.2.1 Environmental Awareness

The Contractor shall implement an employee's environmental awareness program which will be provided to construction and operation employees with information to encourage awareness and preservation of the desert ecosystem and the resources found in the Western Mojave Desert. This information shall be distributed to and discussed with all employees during employee orientation sessions. This information shall also be provided to all visitors and subcontractors that will be on-site. The Contractor shall have all persons participating in the environmental awareness program sign a statement declaring that the individual understands and will adhere to the guidelines set forth in the program material.

#### 3.3.2.2 Trash and Litter Control

The Contractor shall develop a strict trash and litter control program. A litter control program shall consist of supplying an adequate number of covered trash and litter receptacles in all appropriate locations. All containers shall be raven-proof, and all aspects of the litter control program will discourage the scavenging of litter by ravens in addition to providing receptacles for trash generated on-site.

### 3.4 NOISE CONTROL

The Contractor shall follow all terms and conditions regarding noise control identified in the Environmental Document. All operations shall be conducted to minimize impacts to residents, workers and wildlife in the area. All noise-generating devices shall be equipped with silencers and mufflers, and any other devices required to minimize noise and dust.

### 3.5 PROTECTION OF AIR RESOURCES

The Contractor shall keep construction activities under surveillance, management and control to minimize air emissions and protect air resources. All activities, equipment, processes, and work managed or performed by the Contractor in accomplishing the specified construction shall be in strict accordance with California Air Resources Board (CARB) criteria, and all Federal laws and regulation governing Air Quality issues including emissions, permitting and performance laws and standards. In addition, all applicable Air Pollution Control District Rules and Regulations shall be adhered to. All requirements of the mentioned rules and regulations as well as the special management techniques as set out below shall be implemented to control air pollution by the construction activities which are included in the contract.

#### 3.5.1 Particulate Matter

Dust particles, aerosols, and gaseous by-products from all construction activities, processing and preparation of materials, such as from asphaltic batch plants, shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause the air pollution standards mentioned

in the paragraph 'PROTECTION OF AIR RESOURCES' to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type (Contractor must submit and the Contracting Officer approves the Material Safety Data Sheets), light bituminous treatment, baghouse, scrubbers, electrostatic precipitators or other methods will be used as required to control particulates in the work area. Sprinkling, to be efficient, must be repeated at such intervals so to keep the disturbed area damp at all times. The Contractor must have sufficient competent equipment and personnel available to accomplish this task. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs or is potential to occur.

#### 3.5.2 Other Criteria Pollutants

Hydrocarbons, Carbon Monoxide, Nitrogen Oxides, Sulfur Oxides, lead, and others. All identified emissions generated from equipment of (processes shall be controlled) per applicable Federal, State, and local rules and regulations. All permitted devices shall be operated per the identified limitations. Best Available Control Technology (BACT) and/or Reasonably Available Control Technology (RACT) shall be employed as required.

#### 3.5.3 Hazardous Air Pollutants

All Federal and State regulated hazardous air pollutants shall be controlled and monitored as required by applicable laws and regulations. Permitted devices and processes shall be operated per the identified limitations.

#### 3.5.4 Odors

Odors shall be controlled at all times for all construction activities, processing and preparation of materials.

#### 3.5.5 Monitoring Air Quality

Monitoring of air quality shall be the responsibility of the Contractor. All air areas affected by the construction activities shall be monitored by the Contractor.

#### 3.5.6 Internal Combustion Engines

Kern County APCD Rule 202 requires a permit on all internal combustion engines over 50BHP not connected to a transmission. No permit is needed if the equipment shall be removed from Edwards AFB in 45 days or less. These engines include, but are not limited to, generators, compressors, and welding machines. If the equipment shall remain on-base for longer than 45 days, a permit from the APCD will be required. The permit shall remain on base as long as the equipment remains, and the contractor shall produce the permit when requested to do so. For further information, contact the AFFTC/EM at (805) 277-1401.

### 3.6 PROTECTION OF JOSHUA TREES

#### 3.6.1 Joshua Trees Within Project Site

Due to the limited vegetation in the area, removal or relocation of plants shall be minimized. The Contractor shall obtain approval from the Contracting Officer before removing or relocating any plants within the construction boundaries. Joshua Trees shall be protected to the extent possible and coordination made with the Contracting Officer before moving or relocating this species. Procedures for relocating those within the project site are described as follows:

#### 3.6.2 Joshua Trees

Only trees under 5 feet tall shall be moved using hand tools. Mark the north side of the tree and plant in same orientation. Using shovel, dig down to get main root mass (generally within 2 feet of surface). Try to get tap root and a fibrous water storage structure that it leads to. Take some of the top soil to put in new hole. Roots



should be dusted with sulfur to prevent rot. A small amount of manure can be mixed in soil when replanting. Soil should be tamped down and a small berm placed around plant 5-foot diameter. Water with several gallons. Stake in two directions to prevent wind from knocking tree down. If not transplanted right away, "heel in" plant (lay tree on its side and cover roots with soil). Very large Joshua trees (10 by 20 feet tall) shall not be moved, instead, utilities shall be detoured around trees. If plants need relocation areas, they can be replanted and used for landscaping around the Base.

### 3.7 COMPLIANCE LOG

The Contractor shall establish and maintain quality control for environmental protection operations to assure compliance with contract requirements and maintain records of his quality control for all construction operations, including, but not limited to the following items. The Contractor shall record on daily reports any problems in complying with laws, regulations and ordinances, and shall record corrective action taken. Three copies of these records and tests, as well as the records of corrective action taken, shall be furnished to the Government at the end of the project as directed by the Contracting Officer.

#### 3.7.1 Laws, Regulations, and Ordinances

The Contractor must comply with all Federal, State, and local laws, regulations and ordinances, concerning pollution control. This includes submitting a Hazardous Materials and Hazardous Waste Management Plan for Edwards AFB.

#### 3.7.2 Protection of Land Resources

The Contractor shall prevent landscape defacement and provide post-construction clean up.

#### 3.7.3 Protection of Water Resources

The Contractor shall prevent the contamination of lakes, ditches or other bodies of water with harmful chemicals. The Contractor shall dispose of waste materials to an approved off-base disposal site, and the Contractor shall provide erosion control.

#### 3.7.4 Pollution Control Facilities

The Contractor shall provide for the maintenance of pollution control facilities, and shall conduct a training course on the maintenance of pollution control facilities.

### 3.8 INSPECTION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with the Contractor's Environmental Protection Plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of proposed corrective action and take such action as may be approved. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions will be granted or costs or damages allowed to the Contractor for any such suspension.

### 3.9 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all area(s) used for construction.

### 3.10 RESTORATION OF LANDSCAPE DAMAGE

The Contractor shall restore all landscape features damaged or destroyed during construction operations to original conditions, including removal of all debris, trash, and rubbish. Revegetate disturbed desert areas. Such restoration shall be in accordance with the plans submitted for approval to the Contracting Officer, and shall include an AFFTC/EM approved revegetation plan. Contractor is encouraged to minimize the amount of desert disturbed that shall require restoration.

### 3.11 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain all constructed facilities and temporary pollution control devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

### 3.12 TRAINING OF CONTRACTOR PERSONNEL IN POLLUTION CONTROL

The Contractor shall train his personnel in all phases of environmental protection. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities (vegetative covers and instruments required for monitoring purposes) to ensure adequate and continuous environmental pollution control.

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## **ATTACHMENT 2**

### **PROCUREMENT PACKAGE REQUIREMENTS**



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## PROCUREMENT PACKAGE REQUIREMENTS

1. Letter requesting acquisition. Letter shall include the following information at a minimum.
  - \* a. Performance period.
  - \* b. Ozone Depleting Substance (ODS) statement if the ODS is not to be used in the performance of the contract. If the ODS is to be used, then a statement indicating the ODS chemical and the proposed usage shall accompany the ODS.
  - \* c. A statement as to whether or not hazardous materials will be used in the performance of the contract.
  - \* d. Any other unique requirements of the project such as phased, scheduling, restricted work hours, limited access, sole source material requirements, security requirements ect.
- \*2. Statement of Work.
- \*3. Drawings.
4. Purchase Request (if current year buy) or Authority to Advertise and Advance Copy of Purchase Request (if future year buy).
- \* 5. Government Estimate/Cost Estimate in AF3052 format.
  - \*a. Blank cost estimate sheet used for negotiations with 8A contractors.
6. Procurement Integrity Letter (if Government estimate is \$100 or more).
- \*7. List of Trades.
- \*8. Liquidated Damages.
- \*9. AF66 listing all required submittals.
10. Copy of AF332.
11. Copy of AF813
- \*12. Draft of Contract Line Items (CLINS) and estimated quantities if an indefinite delivery/indefinite quantity (IDIQ) requirement.

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\*Architectural engineer contractor responsibilities



Air Force Flight Test Center  
Edwards Air Force Base, California

Edwards Air Force Base has been home to many historic firsts in the modern age of flight and represents the cutting edge in flight technology. Facilities constructed at Edwards should not only support the intended purpose, but should also reflect the base's continued leadership in technology and flight. In order to ensure facility designs communicate this message, the Edwards Air Force Base Design Standard has been developed.

This design standard serves a multi-fold purpose: First is to assist facility users, planners, and programmers in their initial stages of the facility improvements process. Second is to identify to the designer those construction materials and methods consistent with the base's construction theme. Third is to ensure the designer understands the importance of quality facilities which meet the customers' needs and reflect the Air Force tradition of "facility excellence."

This standard provides guidance for all disciplines of construction. By using materials and methods as documented and tested by experience, the time consuming and expensive research to find materials to meet our unusual conditions can be eliminated. Also, implementation of these standards will provide a consistent, cohesive, professional image base-wide. It is particularly important in today's ever-shrinking budget to be vigilant in maintaining a professional appearance throughout the base.

I am pleased to present the Edwards Air Force Base Design Standards. I expect it to be used by facility users, planners, programmers and designers as we strive to improve conditions for all who live, work, play, pray, and visit this installation.

RICHARD L. ENGEL  
Brigadier General, USAF  
Commander